DOCUMENT RESUME

ED 448 365 CG 030 519

AUTHOR	Bibby, Robert Christopher
TITLE	Programmed Writing as a Therapeutic Intervention: A Review of the Literature.
PUB DATE	2000-05-00
NOTE	126p.; Doctoral Thesis, Biola University.
PUB TYPE	Dissertations/Theses - Doctoral Dissertations (041)
EDRS PRICE	MF01/PC06 Plus Postage.
DESCRIPTORS	Adults; Coping; Counseling; *Counseling Techniques; *Creative Writing; Intervention; Literature Reviews; Self Expression; *Therapy; *Well Being
IDENTIFIERS	Traumas

ABSTRACT

Traumatic life events are stressful and when coupled with decreased emotional expression they can have deleterious effects on a person's psychological and physical health. The empirical literature on programmed assignments, specifically Programmed Writing (PW) as a therapeutic intervention, was examined for its potential as a means to facilitate emotional expression and to improve health. The majority of the PW assignments focused on the emotional and cognitive aspects of a past or current trauma using one-to-four sessions. Overall, PW was found to be a cost- and time-effective intervention that may produce significant results in the overall functioning of clinical populations. It has resulted in improved functioning in the areas of affect; cognition; physiology; and behavior. PW assignments that encouraged development, implementation, and review of coping strategies proved most effective in improving functioning. Personality type was also a strong predictor on the effects of a PW assignment. Individuals who disclosed a high amount of material demonstrated stronger immune responses than individuals who disclosed a moderate amount of material. PW may be particularly helpful to populations that have experienced specific traumas and have insufficient coping skills to make their experiences manageable. (Contains 63 references.) (Author/JDM)

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PROGRAMMED WRITING AS A THERAPEUTIC INTERVENTION:

A REVIEW OF THE LITERATURE

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A Doctoral Research Paper

Presented to

the Faculty of the Rosemead School of Psychology

Biola University

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Psychology

by

Robert Christopher Bibby

May, 2000

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PROGRAMMED WRITING AS A THERAPEUTIC INTERVENTION:
A REVIEW OF THE LITERATURE

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ACKNOWLEDGMENTS

I would not have reached this point in my life without the help of many people, whom I would like to now recognize. First, I thank my readership committee, Drs. Tamara Anderson and Randall Lehmann Sorenson. Tammy, thank you for unending encouragement and support these last six years. You have modeled all that I wish to be as a professional and invested much in me. Randy, thank you for challenging me on many levels and teaching me that it's ok to be real with God. Thank you for reminding me to remain focused on the questions, "What business are you in?" and "Why?"

I would like to thank my parents, Mike and Bette Bibby, and my grandfather, Robert E. Bibby, for their love, support, and encouragement through the last six years.

I would like to recognize Kristin McPherson and Bill Ritchey. I am so thankful that I know both of you. Kristin, you have let me experience, time and again, living grace and love. Bill, you have stayed with me in a place that's real and alive. Thank you, brother. You both remained with me in my darkest hour and I will never forget.

Finally, I am grateful to the Lord for providing the opportunity to walk this journey, for staying with me, and for loving me through each of these individuals.

PROGRAMMED WRITING AS A THERAPEUTIC INTERVENTION: A REVIEW OF THE LITERATURE

Introduction

The purpose of this study is to review the empirical literature for programmed assignments, specifically Programmed Writing (PW), as therapeutic intervention. Specific areas of change and the mechanisms underlying those changes will be examined. Also described will be two models through which to examine the changes. The review will address questions raised by this body of research and conclude with a discussion of future directions and goals for research in this area.

The Introduction will explore the specific nature and application of PW. Following will be a review of the current theoretical explanations for the changes believed to take place through this intervention. The introduction will conclude with a discussion of two models used to understand these changes.

Programmed Writing

It has been recognized that traumatic life events are stressful and can have deleterious effects on one's psychological and physical health (Pennebaker & O'Heeron, 1984; Selye, 1976), including the onset of disease. For example, experiencing a stressful event, such as marital disruption, has been associated with greater depression and impairments in several indices of cellular immune function

(Kiecolt-Glaser et al., 1987). Previous research has demonstrated an association between decreased emotional expression, increased rumination, and a decrease in the immunological control over a latent virus (DeLisi, Nurnberger, Goldin, Simmons-Ailing, & Gershon, 1986). Further, emotional expression has also been demonstrated to influence the progression of cancer (Gross, 1989). In response, there is a general consensus among clinical psychologists that individuals benefit from talking about stressful and traumatic events with others (Esterling, L'Abate, Murray, & Pennebaker, 1999).

One avenue through which healthy emotional expression can take place is PW assignments. PW differs, by definition, from the forms of emotional expression typically found in psychotherapy (Esterling et al., 1999). Such assignments may range from the open-ended to the structured. On one end of the continuum, clients may free associate, writing or saying whatever comes to mind. The style may vary between the abstract and concrete. On the other, structured end is PW, which features circumscribed assignments, typically about a situation or trauma. PW is an assigned form of expression, and there is a multitude of forms to these assignments. The assignment may include the rote facts of an event, cognitive formulations, emotional experiences, or a combination of these items. The assignments may involve specific lessons or instructions to focus on a specific topic, and are often time-limited.

During the last decade, PW has been demonstrated to have salutary effects on psychological and physical health (Esterling et al., 1999), and its use as a therapeutic intervention has increased significantly (L'Abate, 1991). These interventions have been used to facilitate adjustment to traumas as well as common, situational stressors. PW has been successfully demonstrated to have beneficial effects on chronic physical ailments (Smyth, Stone, Hurewitz, & Kaell, 1999) and as a tool for improving immunological response to disease (Petrie, Booth, Pennebaker, Davison, & Thomas, 1995). Although there is not a wide breadth of empirical research aimed at investigating the effectiveness of PW, one author, James Pennebaker, has focused considerable effort in this area.

In spite of the increased interest and use of these interventions, many questions remain in isolating the essential aspects of PW. For example, is PW about cognitions versus emotions more effective in bringing about change? Under what conditions is PW effective? What populations and diagnoses should these interventions be applied to? What is the underlying mechanism of change involved? Does the presence of a therapist influence the outcomes of using these interventions? What are the limitations of these interventions?

Due to the current state of the literature on PW, this study will not definitively answer these questions. However, it will provide the most current empirical and theoretical explanations. Along these lines, the following discussion will address the changes that are believed to take place during PW. PW can produce a number of changes related to improved health that can be classified into three broad areas: shifts in cognition, shifts in affect, and disinhibition (Esterling et al., 1999).

Cognitive shifts. It has been proposed that if a stressor or trauma disrupts an individual's schema, or world-view, through which he organizes and understand his world, cognitive restructuring may be needed in order to assimilate the trauma (Horowitz, 1976). Sharing an experience with others may facilitate the development of organization (Meichenbaum, 1977), structure, and meaning (Silver & Wortman, 1980) for a given event. Through exchanging information with others, trauma survivors may learn that they are not alone in their experience, and they may learn new coping mechanisms and resources that they had not previously considered. The effects of actual physical activity (such as in PW) have been recognized as critical factors in both cognitive shifts and the acquisition of coping skills.

Another explanation of how disclosure impacts health is habituation (Greenberg, Wortman, & Stone, 1996). "Physiological habituation results in a cognitive redefinition of what it means to experience fear, such that catastrophic implications are minimized and the time-limited, controllable nature of affective arousal is recognized" (p. 589). Through this process, hyperarousal is reduced from an overwhelming, omnipresent emotional state to a manageable, situation-specific signal of actual danger. This re-conditioning process paves the way for adaptive behavior in situations that require it.

Affective shifts. Affectively, when patients talk with others about a stressful event, they may receive social support from others who have experienced similar situations (Valins & Nisbett, 1987). As trauma survivors recognize that they are not

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alone in their experience, they may be able to recognize and accept undesirable feelings regarding a trauma. They may experience an emotionally safe environment such that they are able to process uncomfortable affect and diminish its disruptive impact on their daily functioning. Social support has been shown to act as a preemptive buffer against the adverse effects of stress (Swann & Pridmore, 1985).

Breuer and Freud (1895/1966) proposed that the source of symptomatology seen in hysterical patients lie in unconscious "strangulated affect" associated with the repressed memories of past traumas. Their prescribed treatment involved recalling the trauma and experiencing its associated affect. They proposed a link between cognition and affect involving a significant or traumatic experience. When the experience is particularly disturbing, the cognitive aspects, or memory, of the event may be suppressed. However, the affect will remain in the form of disruptive anxiety. Their prescribed treatment, the cathartic method, or talking cure, involved recalling the disturbing memory and linking it with the anxious symptoms. These symptoms were found to decrease after a patient described the memory in specific detail. Scheff (1979) has proposed that the primary ingredient of catharsis is not verbal recollection, but emotional discharge itself. He also takes the process a step further, stressing not only immersion in emotional distress, but also an optimum emotional distance such that perceptions of control and mastery over the upsetting feelings can be developed. It should be noted that the explanations of catharsis and habituation both emphasize the element of self-efficacy, suggesting that the beneficial effects of disclosure do not lay in the act of emotional disclosure itself, but in the individual's sense of control and mastery over distressing affect.

Disinhibition. Many traumas, however, are difficult to disclose to others. Depending upon the individual trauma survivor, traumas such as divorce, sexual abuse, rape, and job loss may provoke such strong feelings of shame and embarrassment that patients do not feel comfortable discussing them with others (Pennebaker & Beall, 1986). In order to conceal their feelings about a personal and traumatic experience, individuals must inhibit their overt, bodily behaviors, facial expressions, and certain topics of conversation. Further, they may attempt to restrict the presence, frequency, or intensity of certain thoughts, feelings, and behaviors.

Research suggests that the psychological and physiological energy invested in inhibition over an extended period of time produces cumulative stress on the body (Pennebaker & Chew, 1985), possibly leading to disease onset and/or progression. For example, across several surveys, adults who reported having had experienced a childhood traumatic event were more likely to report current health problems if they had not disclosed the trauma to others than if they had disclosed it (Pennebaker & Susman, 1988). Moreover, Petrie, Booth, and Pennebaker (1998) have presented preliminary evidence that thought suppression (which is most frequently used to suppress unwanted emotions) over a significant period of time may cause changes in the immune system, which could compromise health.

It would follow that disclosing traumatic experiences with others would have a positive effect on accumulated stress related to inhibition, which may then lead to a decreased incidence of disease onset and progression (Pennebaker & Beall, 1986). Pennebaker and O'Heeron (1984) investigated the coping strategies of individuals who had lost a spouse due to suicide or an accidental death. They found that the more an individual discussed his or her spouse's death with friends, the fewer the reports of health problems. Ruminating about the death was moderately correlated with an increase in reported illness. Yet, the more they confided in friends, the less they ruminated about the death. Their work suggested that confiding in others and decreasing rumination may reflect similar, though not necessarily causal, processes.

Understanding Change

The following is a discussion of two models for understanding these changes. The first model is personality-based. It considers the individual differences between personalities, and how they may impact one's approach to coping with traumas. The second model is developmental-based. It postulates developmental stages that all individuals may experience, and how they influence coping effectiveness.

Personality-based approaches to coping.

Whereas some events are not disclosed because of the sensitive nature of the specific trauma involved, some individuals display an inherent disposition toward not disclosing personally traumatic information. Several studies have been conducted in order to determine if there is a link between these individuals, often classified as repressors, and the onset and progression of disease.

Previous research has found that repressors demonstrate higher rates of cancer (Kissen, 1966), mortality rates following a breast cancer diagnosis (Derogatis, Abeloff, & Melisaratos, 1979), high blood pressure (Davies, 1970), and overall physical disease (Blackburn, 1965). When faced with a psychologically stressful task, repressors also exhibited significantly higher skin conductance and forehead-muscle tension than nonrepressors (Weinberger, Schwartz & Davidson, 1979). Repressors have also demonstrated higher skin conductance levels (Buck, 1979) and, in certain situations, higher cardiovascular responses (Notarius & Levenson, 1979), indicating increased stress placed on the heart.

Another personality dimension that has been noted is Negative Affectivity (NA; Watson & Clark, 1984). NA is a tendency to experience and report distressful emotions in most situations. Although NA has been associated with subjective reports of unpleasant moods and physical symptoms (Tellegen et al., 1988), individuals with high NAs have not been distinguished from low NAs on objective health markers (Watson & Pennebaker, 1989). The differences between repressors and nonrepressors, and individuals with high and low NA raise the question of whether individuals can alter their approach to traumatic events, or life crises, and reduce their deleterious effects. If so, what are the implications for treating trauma victims with repressive and high NA personalities.

Developmental-based approaches to coping. Coping with traumatic experiences can also be viewed as occurring through circumscribed stages. For example, Schneider

(1984) described how a developmental model can be applied to major life transitions, and Worden (1991) described four developmental stages of grief. In these approaches, coping deficits are viewed as a disruption in one of the stages, and the prescribed treatment is to facilitate continued developmental progression. It is unclear how a developmental approach to coping interacts with inhibition and personality proclivities.

In summary, PW was theoretically proposed as prescribed interventions for trauma survivors. Several questions as to its application, underlying mechanisms, and limitations were presented. Three theoretical changes, cognitive shifts, affective shifts, and disinhibition, were illustrated. Finally, two models, a personality-based model and developmental-based model, for understanding these changes were presented.

The following section will review several methodological considerations that apply to the majority of research literature on PW. Following these considerations, the remainder of this study will review the empirical literature for PW. Then, a review of several anecdotal references and case studies for the therapeutic use of writing and journaling will be presented. The review will conclude with a discussion of the application of these techniques and future directions for research.

Methodological Considerations

The clinical literature on PW can be criticized for several recurrent problems in its methodology. This section will review the methodological issues and criticisms that are common to the PW literature as a whole. Unique considerations for each study will be discussed in their respective sections.

Definitions

As described in the Introduction, there is a multitude of PW assignments (Esterling et al., 1999). The clinical research in this area is no less replete with varied applications of PW, ranging from differing amounts of time to the completion of the assignments independently or with the assistance of a therapist. Such differences can compromise direct comparison between studies.

There was some variation in the types of subjects the participants were asked to write about. Those subjects will be specified in the reviews of the individual studies. When reading those definitions, it should be kept in mind that several of the definitions leave room for various interpretations.

Because inhibition and disinhibition are important concepts in the PW literature, several studies attempted to measure them (these specific measures, which define inhibition for a given study, will be discussed in their respective sections). However, several of the studies equate inhibition with previously undisclosed information. This definition is flawed. For example, though an individual has not disclosed personal information prior to the study, he may not have actively inhibited that information. He simply may have not had the need or impulse to disclose it in the past (which would eliminate the need for inhibition).

The control participants in the PW literature were assigned to write about trivial topics. Examples of such trivial topics include the contents of the participants' closet, what they've done the day of the experiment, their activities for the remainder of the day, or a description of their shoes. Unless otherwise noted, it may be assumed that this definition applies to all of the control groups discussed in this review. Further, in several studies, control participants were not instructed to avoid emotional terms. When this is given as part of the instructions of a given study, it will be specified in the review.

Samples

The use of undergraduate students for research purposes, though more assessable than specialized populations (such as trauma victims), challenges the external validity of the results (e.g., the degree to which the results are generalizable to larger populations). Further, the majority of the studies did not control for the race and sex of the participants. Moreover, the authors often did not control for the presence of psychological co-morbidity with the traumas discussed.

Several of the studies attemped to examine long-term changes in health using the mean number of monthly visits the participants made to student health centers for illness and self-reports of health. However, the studies did not control for pre-existing health problems that may account for a percentage of the visits to the student health center and mask the effects of the intervention being studied. For example, a student may visit the health center for what is recorded as a new illness but, in fact, is a product of a chronic health problem. On the other side of the continuum, overall, undergraduate students may have fewer medical problems than the general population, which may overestimate the effects of the intervention under examination.

Other external circumstances may contaminate the findings. For example, many of the studies asked participants to write essays on a topic(s) over the course of several days. If a participant was currently in therapy, a therapeutic session may influence the essays subsequent to that session. Similarly, some participants may have written about coping behaviors they had learned through a social contact and improved their health on the basis of solidifying that information.

Many of the participants were asked to write about traumatic experiences. However, traumatic experiences vary on many dimensions. For example, they may differ with regard to severity, the presence of long-lasting effects, physical versus psychological effects, and level of subsequent impairment. These variations all could contaminate the results. Because the quantity of external circumstances is virtually endless, the experimenters cannot be faulted for their lack of control over every external contamination. However, this limitation should be kept in mind when interpreting the results.

Measures

There are several questionnaires used in the PW literature that were designed to tap specific issues pertinent to evaluating PW. Many of these questionnaires lack reliability and validity data. However, given their precise nature, many of them appear to have face validity. There are also not other known instruments that would evaluate the same items. Thus, the use of these unstandardized instruments is acceptable.

Self-reports of health were often the primary measure of changes in long-term health. It should be kept in mind that these reports may or may not correlate with objective markers of health, such as the number of visits to a health center. Furthermore, with regard to examining essay content, it should be kept in mind that the participants theoretically may have self-selected the types of essays they would write about as well as the degree to which they discussed them. The wide use of self-report indexes could be subject to social desirability, errors in recall, and the demand characteristics of the tasks. Furthermore, follow-up data may have been contaminated by the spontaneous development of new coping strategies.

Several of the studies examine specific antibodies as a measure of immunological data. However, often, only one or two antibodies were evaluated. The changes observed in the antibodies could have been due to an overall shift in antibody levels and not necessarily the intervention under scrutiny.

Procedures

All of the studies had participants write in solitude and return their essays with an identification code written on it. They placed their essays in an envelope before leaving. In this way, the participants' anonymity was maintained. It also allowed the experimenters to remain blind to the testing conditions. Although this procedure encouraged more honest disclosures from the participants, it is unclear what influence a therapist (who administered a PW assignment) would have over the content of the essays.

Participants were often assured not to give concern to spelling or stylistic errors. However, there are also a few control problems with the interventions common to many of the studies. Except where noted, participants were not restricted to write about the same trauma on consecutive days, raising the possibility that writing about a single trauma, as opposed to multiple traumas, may produce different outcomes. In addition, most of the studies made no restrictions with regard to the nature of the traumas discussed (e.g., when the trauma took place, trauma severity, the subjective intensity of the trauma, the amount of stress produced by the trauma). Because the particular trauma was often not controlled for, it is possible that a nonrandom trauma could have been addressed in the experimental conditions that could account for between group differences. Participants who were asked to write about undisclosed traumatic experiences were often asked to write about a topic that they had not discussed with "many" people, or had not discussed "in detail." Variations in the participants' interpretation of what amounts to "many" people and an "in detail" discussion could vary widely, confounding the results.

Many of the studies did not control for sex differences, personality differences, or developmental differences in coping behaviors. Because the authors often interacted with participants to give them instructions, those interactions, though brief, may have influenced the results. Finally, the authors used the number of visits to student health centers as a measure of the long-term effects of PW or PS. However, many of the studies do not include a pre-college baseline for comparison. Finally, as a majority of the studies involves Pennebaker as one of the experimenters, it is theoretically possible that experimenter effects could have influenced the studies.

Regarding the statistical procedures, all of the studies relied heavily on inferential statistics. Although these tests were robust, repeated application of the tests on different variables raises the probability of making Type I errors, rejecting the null hypothesis when it is, in fact, true. In this review, general statistical procedures will be discussed. More specificity will be given in instances when it is deemed relevant to the study.

Empirical Literature Review

The empirical literature for PW will be presented first, in chronological order. This will be followed by a brief review of the nonempirical literature on PW. The review will close with conclusions gleaned from the studies. Because of the wide variations in the studies' unique limitations, they will be presented following each individual study. P-values will typically not be given for every test except when its value was $> .05$; unlisted p-values may be assumed to be equal to or less than the .05 level of significance.

Pennebaker and Beall (1986)

In one of the first studies of its kind, Pennebaker and Beall (1986) examined whether a PW assignment about a traumatic event would impact long-term measures of health. They sought to learn whether merely writing about a traumatic event would reduce the stress associated with inhibition over short and long periods of time. Their second goal was to assess the aspects of dealing with a past trauma that were effective in reducing stress.

Procedure. Forty-six undergraduate students were randomly assigned to one of four groups: (a) a trauma-emotion group, in which participants wrote about their feelings associated with one or more traumas they had experienced; (b) a trauma-fact group, in which participants wrote only about the facts of one or more traumas they had experienced; (c) a trauma-combination group, in which participants wrote about both their feelings and the facts surrounding one or more traumas; and (d) a control group (Pennebaker & Beall, 1986). Each participant wrote for 15 minutes for four consecutive evenings. In this study, the definition of a trauma was defined as a "personally upsetting experience" (p. 275).

Measurements. After each session, participants completed a questionnaire that allowed participants to rate their own essays as to the degree to which they were personal, meaningful, and had revealed their emotions (Pennebaker & Beall, 1986). The measure also evaluated (a) how much they had wanted to talk to others about the traumas written about, (b) had actually talked to others about the traumas, and (c) had actively held back from talking to others about the traumas that they wrote about. Finally, for trauma participants, it also rated the severity of the trauma written about and the extent to which this event was currently affecting their lives. Participants used Pennebaker's 7-point scale ranging from 1 (*not at all*) to 7 (*a great deal*) to answer these questions. (This 7-point scale will be referred to in the discussion of other instruments.) This questionnaire would be named the Essay Evaluation Measure (EEM) in a future study (Pennebaker, Kiecolt-Glaser, & Glaser, 1988).

In order to answer their research questions, Pennebaker and Beall (1986) needed to evaluate the level of previous inhibition of the traumatic events written about. To this end, the authors examined the EEMs and subtracted the ratings of previous disclosure from the ratings of how personal the essay had been for each (a) session, (b) participant, and (c) condition. Participants with a 4 or more point difference were classified as individuals who disclosed a previously inhibited experience. As an additional measure of the content of the essays, the essays were coded as to the number of words written, percentage of self-references, number of mark-outs, and (for the trauma groups only) the general theme of the essay.

Several physiological measures were collected (Pennebaker & Beall, 1986). Before and immediately following the writing of each essay, participants had their blood pressure and heart rate taken. Heart rate, systolic blood pressure, and diastolic blood pressure were combined to produce a general cardiovascular index.

Before and after each essay, participants also completed several questionnaires (Pennebaker & Beall, 1986). The first questionnaire was Pennebaker's Negative Mood Scale (Pennebaker, 1982). This measure evaluates the degree to which individuals are currently experiencing eight negative moods (e.g., nervous, guilty, not happy). Because research has demonstrated that these symptoms are correlated, the items were summed to compose a general negative mood index.

The second questionnaire was Pennebaker's Physical Symptom Scale (Pennebaker, 1982). Using the 7-point scale, participants rated the degree to which they were currently experiencing each of eight physical symptoms (e.g., racing heart, upset stomach). These items were summed to produce an overall symptom index. Average internal consistencies (coefficient αs) for the Negative Mood Scale and the Physical Symptom Scale have been approximately .75 across several studies.

At the beginning of the study and 4 months following it, participants completed an additional series of questionnaires (Pennebaker & Beall, 1986). The questionnaires included the Cognitive and Social Anxiety Questionnaire (CSAQ), the Marlowe-Crowne Social Desirability Scale, and the Pennebaker Inventory of Limbic Languidness (PILL), a general physical symptom inventory constructed by Pennebaker (1982). Previous research has demonstrated that the PILL is internally consistent and reliable over time.

Also at baseline and the 4-month follow-up, an unnamed questionnaire that inventoried a number of health-relevant behaviors was administered. Specifically, the questionnaire asked (a) the number of days' activity restricted due to illness during the previous 6 months, and (b) the number of times the participants visited a physician or clinic for illness during the previous 6 months. (To eliminate confusion, this questionnaire shall be called Pennebaker and Beall's Health Questionnaire.) The follow-up questionnaires also asked participants to rate the degree to which they had thought about the study since participating in it, the degree to which they felt the study had had an impact on them, and the degree to which they had discussed the study with others. An additional questionnaire, given at the 4-month follow-up, asked participants to report, using the 7-point scale, how much they had thought about and been affected by the study.

The follow-up data also included the primary measure for the long-term effects on health (Pennebaker & Beall, 1986). At the conclusion of the school year, the Student Health Center reported the number of times students had visited the center for a variety of reasons (e.g., illness, psychiatric, injury). The data range extended from 3 months prior to the study and the 6 months following the study.

Results. There were four areas of analysis: (a) the content of the essays, (b) the participants' responses to the essays, (c) the long-term effects of the essays, and (d) individual differences between participants (Pennebaker & Beall, 1986). Analyses of variance (ANOVA) were calculated to evaluate the data. The first area of analysis dealt with the content of the essays. All of the trauma groups reported writing more personal essays than did control participants. Contrasts using the mean-square error term indicated that trauma-emotion and trauma-combination participants revealed their emotions to a greater degree than did either the trauma-facts or control participants. Pairwise comparisons indicated that all trauma-participants wrote more personal essays and more topics not previously discussed than control participants.

The second area of analysis was the participants' responses to the essays (Pennebaker & Beall, 1986). A multivariate analysis of variance (MANOVA) indicated that the three physiological measures were significant. Follow-up ANOVAs indicated that all of the effects were due to a lowering of blood pressures (e.g. systolic blood pressures) over the course of the experiment for all participants. The trauma-combination group initially demonstrated a large increase in blood pressure from before to after the essay. However, after the first session, these participants evidenced moderate decreases in blood pressure from before to after the writing session. This suggests that the writing may have been initially stressful, but decreased in stress as participants became accustomed to them.

Pennebaker and Beall (1986) found that trauma participants (trauma-emotion and trauma-combination) tended to report more negative moods after writing each day's essay. Further, over time, trauma participants' negative moods increased after writing each essay. Control participants typically felt more positive after writing the essays.

Contrasting using the mean-square error term for several subsets demonstrated similarities in a subset composed of trauma-emotion and trauma-combination participants (Pennebaker & Beall, 1986). It also demonstrated similarities in a subset composed of trauma-fact and control participants. These two subsets differ from each other in several respects from before to after writing each day's essay. Compared with the trauma-fact/control subset, the trauma-emotion/trauma-combination subset used a greater percentage of self-references, were more revealing of their emotions, had lower blood pressure, and a greater decrease in self-reported negative moods. These findings illustrate the value of incorporating emotional discussion into the PW assignments.

The third area of analysis examined the long-term effects of the study and included several items (Pennebaker & Beall, 1986). There were no significant differences between the groups at the beginning of the study. All participants, save for the trauma-combination participants, demonstrated an overall increase in health center visits. The number of health center visits due to injury, psychiatric, or other reasons did not produce any significant effects. Further, participants in the control group reported the greatest number of days their activities had been restricted due to illness and trauma-combination participants reported the least. After the study, participants in the trauma-combination and trauma-emotion groups reported reductions in health problems relative to those in the control and trauma-fact groups. Health-related behaviors were not significant. The trauma-emotion and trauma-combination groups were more likely to have thought about their essays than those in the trauma-facts or control groups.

The fourth and final area of analysis in this study examined the aforementioned questionnaires for individual differences between participants (Pennebaker & Beall, 1986). Across conditions, no individual differences were found. Although women reported writing about more personal events than men, no other sex differences were noted.

Limitations. There are several limitations unique to this study (Pennebaker & Beall, 1986). The traumas that were discussed were generally common experiences for the samples' age group (e.g., problems with parents or friends). Regarding measurement, the assessment of the level of disinhibition is confounded by the fact that they used an artificial measure (e.g., degree of previous disclosure subtracted from degree of how personal the essays were), which may or may not reflect disinhibition. Some issues were assessed with a single question (e.g., how much participants had thought about the study).

The changes in health concerns were limited to the 6 months following the study (Pennebaker & Beall, 1986). Finally, the follow-up data could have been tainted by two variables: (a) A thorough debriefing following the intervention could have produced expectancy effects, and (b) new coping strategies could have spontaneously developed following the experiment.

Pennebaker, Kiecolt-Glaser, and Glaser (1988)

Pennebaker, Kiecolt-Glaser, and Glaser (1988) investigated the effects of a PW assignment about a personal trauma on immunological functioning. They also wanted to explore the effects of writing on psychological functioning. The authors predicted that writing about traumatic experiences would produce an increase in immunological variables relative to individuals who write about superficial topics. Pennebaker et al. also wanted to understand the role of disinhibition in this process.

Procedure. In this study, researchers randomly assigned 50 undergraduates to one of two conditions (Pennebaker et al., 1988). The groups had participants write about either their "deepest thoughts and feelings [regarding] the most traumatic and upsetting experiences of [their] entire" lives (p. 240) or an assigned, trivial topic (e.g., describing their activities during the day, the shoes they were wearing). Each participant wrote for 20 minutes on each of four consecutive days.

Measurements. Four types of data were used to measure these effects (Pennebaker et al., 1988). The first type of data was lymphocyte (white blood cell) response to substances that are foreign to the body. Blood samples were drawn from both groups (trauma-participants and control-participants) the day before the first session, immediately following the forth session, and 6 weeks after the writing sessions. It was then exposed to two samples of foreign mitogens (PHA and ConA). The lymphocytes' ability to respond to the foreign mitogens was then compared. An increase in lymphocyte concentration suggested greater immune functioning.

The second measure of the long-term effects of disclosing traumatic experiences was the number of health center visits the students made in the 4 months prior to the study and 6 weeks following the study (Pennebaker et al., 1988). This information was provided by the university health center. The number was adjusted to reflect only visits made for illness and controlled for multiple visits per individual illness.

The third measure used to evaluate the long-term effects of disclosing traumatic experiences was a set of questionnaires that included the EEM, Pennebaker's Negative Mood Scale, and Pennebaker Physical Symptom Scale (described under Pennebaker and Beall, 1986; Pennebaker et al., 1988). Another questionnaire was the PANAS, which contains 20 mood descriptors (e.g., active, excited, or hostile). The 10 items assessing positive mood and the 10 items assessing negative mood were summed to produced two "relatively pure markers" (p. 78) of high negative affect (NA) and high positive affect (PA) (Watson, Clark, & Tellegen, 1988). Internal consistency reliabilities have ranged from .86 to .90 for PA and from .84 to .87 for NA, and they were unaffected by the time frames used. Another questionnaire was the Southern Methodist University-Health Questionnaire (SMU-HQ; Watson & Pennebaker, 1989). It consists of 63 health problems, including acute infections, chronic problems and more serious conditions. Previous research has demonstrated that the SMU-HQ is internally consistent (alphas = .72 to .82) and reliable over time (test-retest *r*s = .70 to .91). These questionnaires were administered 1 hour after the final writing session, 6 weeks later (prior to the final blood draw), and 3 months following the study.

The fourth measure of the long-term effects of disclosing traumatic experiences was autonomic data (e.g., heart hate, blood pressure levels, and SCL levels; Pennebaker et al., 1988). These data were collected after 10 minutes of rest and 1 hour prior to the three blood draws. No significant effects were found.

The authors examined three questions from the EEM: ratings of (a) how personal the writers considered their essays to be, (b) the degree to which they revealed emotions in their essays, and (c) the degree to which they had previously held back telling others about the subject discussed in their essays (Pennebaker et al., 1988). In addition, two independent judges rated each essay for the degree to which the content was personal. As an additional measure of the participants' response to the essays, participants also completed a questionnaire immediately before and after writing on each day. The instrument (again, not identified) produced a physical symptom scale and a mood scale. Finally, the authors tabulated the total number of words, self-references, and emotional words.

Results. There were three areas of analysis in this study: (a) the long term effects of disclosing traumatic experiences, (b) participant evaluation of and response to the essays, and (c) individual differences in responses (Pennebaker et al., 1988). The first area of analysis examined the long-term effects of disclosing traumatic experiences. MANOVAs and ANOVAs (when appropriate) were used to analyze the data. The immunological data for the two mitogens, PHA and ConA, that were exposed to the blood samples were analyzed separately. For the PHA data, the lymphocyte concentration increased across the three draws, and trauma participants demonstrated an over overall higher mitogen response compared with control participants. For the ConA data, the lymphocyte concentration increased across the two first two draws (The third draw was unavailable due to experimenter error).

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Relative to control-participants, trauma-participants evidenced a drop in health center visits (Pennebaker et al., 1988). Control-participants evidenced an increase in health center visits. The authors suggested the increase in visits made by control-participants may reflect normal, seasonal illness rates for the time when the data were collected (i.e., February).

Trauma-participants initially associated negative feelings with the study, but they were significantly "happier" (Pennebaker et al., 1988, p. 242) than control-participants at the 3-month follow-up. The trauma-participants indicated that the experiment had been significantly more "valuable and meaningful" than control-participants. Although trauma-participants reported feeling more depressed than control-participants on the final day of writing, this difference was not evident at the follow-up questionnaire. The experiment did not appear to influence long-term health-related behaviors.

The second area of analysis was the participant evaluations of and responses to the essays (Pennebaker et al., 1988). An overall MANOVA indicated that the objective and self-ratings were significant. Compared with control-participants, trauma-participants' essays were judged to be more personal. Moreover, relative to control participants, trauma participants wrote more words and included more self-references and more emotion words on each essay.

Averaged across the 4 days of writing, trauma-participants considered their essays to be more personal and more revealing of their emotions than the control-participants (Pennebaker et al., 1988). Further, relative to control-participants, trauma-participants wrote about topics that they had previously held back from telling others. Compared with control-participants, trauma-participants reported higher levels of physical symptoms and negative moods following the writing.

The final area of analysis explored individual differences, specifically, whether trauma-participants benefited equally from the experiment (Pennebaker et al., 1988). To do this, trauma-participants were split at the median into two groups based on their mean response to the question regarding how actively they had previously held back their disclosed trauma. Participants who had previously held back their written topics were placed in a High-discloser group, and the remainders were labeled Low-disclosers.

Prior to the study, there were no differences in autonomic levels as a function of discloser-type or condition (Pennebaker et al., 1988). Overall, with regard to essay characteristics, High-disclosers wrote significantly more words on each essay than Low-disclosers. Although High-disclosers reported that their essays were more personal than Low-disclosers, the independent judges rated the two groups equivalently. From the beginning of the experiment to follow-up, High-disclosers showed a greater decline than Low-disclosers in both systolic and diastolic blood pressure. Overall, with regard to the physiological data, High-disclosers had a slightly higher response to PHA stimulation than Low-disclosers. High-disclosers demonstrated an improved immune response across all mitogen concentrations relative to Low-disclosers and control-participants from before the study to the last day of writing. These results suggest that individuals who disclose a greater amount of material that they had previous held back may demonstrate greater benefits from PW than individuals who disclose material that they had not previously held back.

Limitations. As previously mentioned, the EEM does not have standardization data (Pennebaker et al., 1988). With regard to the immunity variables, normal, seasonal variations in immune response could also confound any conclusions regarding immune response. Moreover, the behavior of the immunity variables, which were examined in vitro in this study, may differ from the behavior of the variables were they studied in vivo, in their nature environment. (However, it is acknowledged that it would be unethical to subject participants to foreign pathogens.) Finally, follow-up measures were collected at a 6-week follow-up, limiting any knowledge of sustained health improvement.

Murray, Lamnin, and Carver (1989)

Murray, Lamnin, and Carver (1989) studied the underlying processes of psychological change between individuals in psychotherapy and individuals who completed PW assignments. Specifically, the investigators examined the dynamics of emotional and cognitive change. The authors also wanted to determine whether the changes would be maintained over time.

Procedure. Murray et al. (1989) compared two, brief psychotherapy sessions with two, 30-minute PW sessions that were each administered 2 days apart. Fifty-six undergraduate students, half female and half male, were randomly assigned to one of three conditions: (a) a trauma group, in which participants wrote a 30-minute essay "about a traumatic or disturbing event, current or in the past" (p. 417); (b) a psychotherapy group, in which participants were to "describe ... a traumatic or disturbing event ... with an emphasis on their emotional experiences," to a therapist for 30 minutes; and (c) a control condition, in which participants were asked to write for 30 minutes about the contents of their closet. Control participants were instructed to write objectively and "avoid emotional terms."

> The authors defined the brief psychotherapy condition as follows:
> The therapy was eclectic in nature using a warm, empathic approach to draw out feelings about the traumatic event, encouraging a deeper understanding and reappraisal of the event for the person, often reframing the event in a way that was less damaging to self-esteem. Problem solving and adaptive behavior were also encouraged. (Murray et al., 1989, p. 417)

The therapists were two male and two female graduate students in clinical psychology with at least 2 years of therapy experience.

Measurements. Several questionnaires were collected throughout the study (Murray et al., 1989). On the first day of writing, after resting for 15 minutes, the participants completed 24 items from the Nowlis Mood Adjective Checklist, which measures eight mood factors on 7-point Likert scales. This short form had a Spearman-Brown internal consistency coefficient of .74 and was believed to be a sensitive and meaningful measure of mood. The participants also had their heart rate and blood pressure measured. This procedure was repeated immediately after the intervention and after a 15-minute "recovery period" (p. 417). The entire procedure was repeated 2 days later.

In addition, a post-experimental questionnaire was also completed at the end of the second session (Murray et al., 1989). This questionnaire contained three questions that were used as dependent variables. They assessed, on a 5-point Likert scale, how personal the material was, "how comfortable they felt now" (p. 418), and how the experience had changed their feelings about the event.

An independent judge analyzed tape recordings of the psychotherapy group sessions and the written essays of the other two groups (Murray et al., 1989). The judge rated several questions regarding the content of the material on a 7-point Likert scale. The questions were as follows:

> (1) To what extent was negative emotion expressed about a stressful event? (2) To what extent was the level of tension changed in this session? (3) To what extent did the material show positive cognitive changes about the stressful event, such as a deeper understanding of the problem or reviewing the problem in a more adaptive way? (4) To what extent did the material show better feeling about the self, such as restoration of self-esteem? (5) To what extent did the material indicate a possible change to problem solving or more adaptive behavior? (p. 418)

A second, independent judge scored a random sample of 49 cases. The Pearson correlations ranged from .61 to .90 after question (2), which had an unacceptably low correlation (.36), was removed.

Lastly, participants were given a 6-month follow-up questionnaire (Murray et al., 1989). In order to avoid demand characteristics, participants were not initially told about the questionnaire. Six months after the study, participants were contacted and asked to complete Pennebaker and Beall's Health Questionnaire (Pennebaker & Beall, 1986). They examined two questions from the questionnaire: (a) the number of days' activity restricted due to illness during the previous 6 months, and (b) the number of times the participants visited a physician or clinic for illness during the previous 6 months. Normal check-ups and injury visits were separated out from these measures.

Results. Murray et al. (1989) had three areas of analysis. The first area examined the immediate effect of the interventions. There were not significant differences in positive and negative mood between the groups at pre-test. Overall, for the PW condition, feelings of sadness, anxiety, and aggression increased after the intervention whereas the psychotherapy and control conditions demonstrated slight decreases. The upsurge in negative mood in the PW condition decreases to the same level as the other condition after the 15-minute recovery period. All groups demonstrated a decline in feelings of fatigue after the interventions. These effects occurred during Session 1 and were absent for Session 2. For positive mood, during both sessions, the psychotherapy condition produced a higher level of elation than the written condition. This effect was more dramatic in Session 2 than Session 1. Thus, PW produced an initial increase in feelings of sadness, anxiety, and aggression, but these feelings subsided quickly, and decreased across two sessions.

The second area of analysis involved a content analysis of the essays (Murray et al., 1989). The post-experimental questionnaire indicated that the groups were not significant differently in the length of time since the traumatic event occurred, how often they had thought about it, or how many people they had discussed it with prior to the experiment. They were also not significantly different with regard to how often they thought about or talked with others about the traumatic events. It also indicated that the PW and psychotherapy groups rated their events as more personal than the control group. The psychotherapy condition produced more change in the participants' feelings about the events than the PW or control groups, which did not differ from one another.

For Session 1, the content analysis of the essays indicated that PW resulted in greater negative emotion about the traumatic event than the psychotherapy condition (Murray et al., 1989). The psychotherapy condition produced greater negative emotion than the control group. The psychotherapy condition resulted in significantly greater cognitive, self-esteem, and adaptive behavior changes than did the PW condition, which produced significantly more changes than the control condition.

For Session 2, an identical pattern occurred, but in muted form. Also in Session 2, there was not a significant difference between the two experimental groups, and both were significantly greater than the control group. Taken together, these findings would suggest that PW is more valuable than no intervention, but not as effective as psychotherapy. Further, they suggest that the negative emotion initially aroused by PW subsides to levels comparable to those experienced in psychotherapy.

Limitations. The cognitive, self-esteem, and adaptive behavior changes that were noted were based upon objective ratings, which may or may not correlate with the subjective experience of the participant (Murray et al., 1989). The presence of a therapist implicit in the psychotherapy condition may have created unrecognized demand characteristics, which could compromise the results. The physiological measures and follow-up data did not produce any significant findings. Finally, the generalization of the study is limited by its small sample and variance produced by the "eclectic" (p. 417) psychotherapy.

Pennebaker, Colder, and Sharp (1990)

Pennebaker, Colder, and Sharp (1990) investigated whether the coping strategies of entering college students could be facilitated by a PW assignment. If this procedure proved effective, the authors wanted to know how the underlying processes of a PW assignment functioned. Further, they wanted to know if the process could be accelerated. They also examined their results with the personality-based and developmental-based models (discussed in the Introduction). They also investigated the influence of an individual's level of inhibition/disinhibition on the process.

Procedure. On the first day of class of the fall semester, 125 first-year undergraduates were randomly assigned to an experimental or control condition (Pennebaker et al., 1990). The students were randomly selected to participate in the experiment at one of four times during the fall semester: (a) early September, (b) late September, (c) late October, and (d) early December. On each of three consecutive days, experimental participants were asked to write about their "very deepest thoughts and feelings about coming to college" (p. 531), including issues of adjustment, thoughts about the future, and who they wished to become in the future. On each of the three days, control participants were assigned to write about specific, trivial topics for each session. They were instructed: "Do not mention your own emotions, feelings, or opinions. Your description should be as objective as possible." All participants wrote alone in a room for 20 minutes each day. Because participants were not told they would be completing follow-up data, they were asked not to discuss the experiment with anyone until the end of the semester.

Measurements. The experimenters needed a way of examining the characteristics of the essays (Pennebaker et al., 1990). To this end, three independent judges codified the essays into raw numbers of words and percentages of total words that were personal self-references, negation (i.e., not and no), positive emotional words, negative emotional words, and mark-outs. In addition, at the conclusion of the third day of writing, participants completed the EEM.

The authors also collected physical and psychological data (Pennebaker et al., 1990). For the physiological data, the Student Health Center provided the number of visits to the center for illness. One of the psychological measures was the College Adjustment Test (CAT), which was completed on the first and last day of classes during the semester of the experiment and again 4 months later. The CAT consists on 19 items that tap the degree to which student had had thoughts or feelings about coming to college during the previous week. On the basis of two large samples, an internal consistency level was found with a Cronbach alpha = .79. A 2-month test-retest with 196 students was good, r = .65.

The authors also examined first and second semester GPAs, college hours attempted, and SAT scores (Pennebaker et al., 1990). The university provided this information to the researchers. Finally, at the end of the fall semester and at the end of the spring semester, participants were asked to rate, on a 7-point Likert scale, the degree to which they had talked and thought about the study and its positive and negative impact.

Results. There were three areas of analysis in this study (Pennebaker et al., 1990). The first area of analysis addressed the characteristics of the essays. ANOVAs were applied to determine if any differences existed. Compared with control participants, experimental participants used more personal self-references, negations, positive emotional words, and negative emotional words. Experimental participants rated their essays as significantly more emotional and personal than did control participants.

The second area of analysis had two points of focus, the physical and psychological effects of writing (Pennebaker et al., 1990). Because pre-study health center data was not available for participants in the first wave, and only limited post-study health center data was available for participants in the fourth wave, two conceptually similar analyses were conducted on the monthly illness data. The first analysis was a between-within participants ANOVA. The month examined included the month that the participants wrote and the five subsequent months. Overall, experimental participants made fewer visits to the health center for illness after writing than control participants. The differences in illness visits between the two groups became smaller in the months following the writing sessions.

The second analysis on the monthly illness data collapsed the mean number of illness visits into three time frames: (a) before the experiment, (b) the months during and following the experiment within the fall semester, and (c) the months of the spring semester after the experiment (Pennebaker et al., 1990). ANOVAs were calculated to find any differences between the groups. Wave 1 participants were not included in the calculation because they could not have had any visits before the experiment.

Again, experimental participants again made fewer visits to the health center after writing than control participants (Pennebaker et al., 1990). But these differences disappeared at 4 months post-writing session. In order to compare these data with normative data, 67 randomly selected freshmen for the same time period were given a random Wave assignment. Comparisons revealed no significant differences between the control and experimental participants.

Overall, marginally lower psychological adjustment was found among participants who completed the writing assignments in late October ($p = .057$) and for all students at the beginning of the semester ($p = .051$; Pennebaker et al., 1990). There was marginal evidence that experimental participants' psychological adjustment decreased from the beginning to the end of the semester, relative to control participants, who evidenced a slight increase ($p = .060$). This decrease in psychological adjustment in experimental participants was accounted for by two significant factors on the CAT:

homesickness and general worry about college. This decrease disappeared by the 4-month follow-up, suggesting that the adverse effects of writing may be limited to the first semester only. Finally, compared with controls, experimental participants thought more about what they had written in the interim, believed the study had "more positive longlasting effects" (p. 534), and was "more valuable or meaningful for them."

Pennebaker et al. (1990) used simple correlations between variables of interest. An illness-change variable was derived by subtracting the mean pre-writing illness visits from the mean number of illness visits in the 4 months following the writing session (*r* = -.25). Female students demonstrated a greater decline in illness visits after writing than did male students (*r* = -.22). However, female students visited the health center much more often before the writing sessions than did male students. This may suggest that new college students who tend to visit the doctor often, and women, may benefit the most from this type of PW.

Limitations. Several of the issues discussed in the Methodological Considerations section apply to Pennebaker et al.'s (1990) study. They will not be reiterated here. It should be stressed that the changes found in health center visits diminished in the months following the intervention. Thus, it is unclear if these differences would be retained if further interventions had been implemented.

Esterling, Antoni, Kumar, and Schneiderman (1990)

Esterling, Antoni, Kumar, and Schneiderman (1990) wanted to assess stable personality traits and different levels of emotional repression. It was hypothesized that these traits and emotional proclivities would influence an individual's response to a PW assignment. The authors also wanted to determine whether there was a relationship between these proclivities and immunological control of a latent virus. Specifically, they examined how different personalities regulate immunological control of the Epstein-Barr virus (EBV). EBV is a latent virus that is found in the majority of the population (90%) and is periodically reactivated. Greater numbers of antibody titers against EBV indicate poorer immune control over the latent EBV.

Procedure. Eighty undergraduates, all of whom were carriers of EBV participated in the study (Esterling et al., 1990). Students were excluded from this sample if they reported use of prescription medications or anabolic steroids within the previous 6 months. Other exclusion criteria were smoking more than one pack of cigarettes per week, more than 10 drinks of alcohol per week, pregnancy, or current participation in psychotherapy. Additionally, students who reported psychiatric or other medical illness within the previous 3 months or a history of chronic mental or physical illness were excluded from the study. Participants were also excluded if they reported skin reactive diseases or active infections (e.g., upper respiratory). Self-reports were used to collect this information.

All participants were initially escorted to a private room where they were asked to relax for 5 minutes (Esterling et al., 1990). They were then asked to "compose a letter to a close friend about an event which they had experienced and which had been highly stressful. All [participants] were asked to select an event which they had not widely discussed with others" (p. 399). They were given 30 minutes to complete the assignment. Participants repeated the process, except for having their blood drawn, a month later.

Measurements. Blood was drawn about an hour after the assignment was completed and evaluated for antibodies against the viral capsid antigen (VCA) and early antigen (EA) of EBV (Esterling et al., 1990). (The specific differences between EBV-EA and EBV-VCA were not delineated.) The antibody titers were determined by the highest dilution of serum able to demonstrate immunofluorescence method (IFA)-positive cells. All of the titer values were reported as the mean log-transformed dilution factor. It should be noted that 26 samples produced seronegative results and were excluded from the immunological analyses.

Two independent judges calculated the total number of words and the percent of emotional words, which was used as an index of emotional repressiveness (Esterling et al., 1990). A Pearson correlation coefficient for percent emotional word scores was calculated on the two judges' ratings. A highly significant inter-rater correlation (r = 0.90) was found. Further, there was no difference in mean percentage of emotional words scored between the raters (t[79] = 1.19). These findings suggest that the scoring procedure was a reliable one. However, there was a modest correlation between the number of emotional words in the first writing session and that of the second (r = 0.34). This suggests that this measure may be influenced by state fluctuations over time, thus challenging the measure's reliability.

Participants were divided into the top, middle, and bottom third of the distribution of percent emotional words (Esterling et al., 1990). Participants who had fewer than 1% were classified as low-disclosers, between 1% and 2%, middle-disclosers, and greater than 2% were classified as high-disclosers. Only data from the first PW session were used in the analyses.

At baseline, all participants completed the Millon Behavioral Health Inventory (MBHI), which assesses individual differences in interpersonal coping styles (Esterling et al., 1990). The inventory is composed of 150 true-false items and yields base rate scores pertaining to eight coping styles (Introversive, Inhibited, Cooperative, Sociable, Confident, Forceful, Respectful, and Sensitive). The subscale scores have a test-retest reliability over 4.5 months ranging from 0.77 to 0.88 with a mean of 0.82 (Millon, Green, & Meagher, 1982).

Depending on their elevations on each of the eight coping scales, participants were then classified into one of three personality groups: Repressors, Sensitizers, and participants with neither personality style (NP; Esterling et al., 1990). Cut-offs for the elevations were prescribed by Millon et al. (1982). Participants whose coping scale scores did not meet the criteria for one of the three groups were not included in the analysis that used this data.

To test the validity of the classification system, base rate elevations for each of the Repressor and Sensitizer scales were compared (Esterling et al., 1990). It was determined that the scales that made up the Repressor category (i.e., Introversive, Cooperative, Respectful) were significantly higher for the Repressor personality group compared to the Sensitizer personality group. Further, two Sensitizer scales (i.e., Forceful, Sensitive) were significantly higher for the Sensitizer personality group compared to the Repressor personality group. The Sensitizer scale Inhibited was not different between the two groups. Overall, the classification system appears to be reliable and valid.

The MBHI and personality classifications are based upon Millon's personality theory (Millon et al., 1982). Accordingly, individuals classified as Repressors ostensibly have an inner need to deny negative feelings to themselves and others. They tend to appear content in the face of problems and may attempt to please others with self-sacrificing behaviors. Individuals classified as Sensitizers ostensibly come across to others as overbearing, aggressive, rivalrous, and confident. They tend to have a low level of frustration tolerance and are quick to express their negative feelings.

As a control measure, self-report data of potentially immunomodulary behaviors were collected (Esterling et al., 1990). Participants reported their amount of restful sleep, hard physical activity and average caloric intake occurring over the previous 6 months. Finally, lean body mass (LBM) was determined according to the Metropolitan Life Insurance actuarial tables, which take into account body weight and frame size in determining the participant's deviation from his/her ideal weight.

A stepwise multiple regression revealed that none of the self-report variables, individually or in combination, accounted for a significant amount of the variance in

EBV-VCA antibody titer variability (Esterling et al., 1990). Further, no significant effects were found when gender was included as an additional variable. Therefore, data for both sexes were combined.

In addition, a MANOVA was calculated for each psychosocial factor to determine differences between the Essay Response groups and the Personality groups (Esterling et al., 1990). In combination, none of the factors differed between the groups. Differences in individual psychosocial factors were not reported.

Finally, EBV-EAs were assessed to determine whether any of the participants were recovering from a primary EBV infection (Esterling et al., 1990). Participants recovering from a primary injection would show EBV-VCA levels that are not representative of latent virus control and more indicative of a primary response to initial viral exposure. It was determined that none of the participants were undergoing a primary viral infection.

Results. There were two angles from which Esterling et al. (1990) examined the effect of the PW on EBV. Both analyses were calculated several ANOVAs followed by Tukey post hoc analyses. The first area of analysis focused on differences between high and low disclosers. They found that high disclosers had lower levels of antibodies to EBV-VCA compared to middle and low disclosers, who did not significantly differ from each other.

The second area of analysis was the effect of personality proclivities on EBV antibody levels (Esterling et al., 1990). It was found that Repressors had significantly higher levels of antibody titers compared to both the Sensitizer and NP groups. Further, the Repressors wrote significantly fewer emotional words compared to the Sensitizers. (The NP group had an intermediate number of emotional words that were not significantly different from either of the other two groups. Thus, criterion validity was demonstrated with the behavioral assessment procedure using the personality instrument as the criterion.)

A factorial design was implemented to highlight the personality influences (Esterling et al., 1990). The resultant cell means suggested that within the Repressor group, different discloser levels did not change the amount of antibody titers. However, within the Sensitizer and NP groups, high disclosers demonstrated lower antibody levels than low disclosers.

All of the confounding variables (drug use, diet, sleep, rigorous activity, LBM, and gender), followed by all of the predictor variables (disclosure level, personality group, and interaction) were entered into a hierarchical multiple regression model in order to predict EBV-VCA antibody titer levels (Esterling et al., 1990). The overall model was significant. Controlling for the confounding variables, a commonality analysis revealed that 24.5% of the variance was accounted for by the disclosure response, 21.7% by personality group, and an additional 3.5% by their interaction. Taken independently, these three predictors accounted for 55.6% of the total variance noted in the EBV-VCA antibody titers. Taken together, these results suggest that greater immune response on a PW assignment will be seen in two groups of individuals: (a) those who disclose a significant amount of material, and (b) those who do not deny negative feelings to themselves and others.

Limitations. Several of the independent variables were not clearly defined (Esterling et al., 1990). First, the characteristics of the individuals assigned to the NP group (neither qualifying as Repressors or Sensitizers) were not given. Therefore, it is difficult to know exactly to whom the results of the NP group apply. Also, the sample reported an average of 3.90 (SEM = 0.55) hours of physical activity per day, but physical activity, an immunomodulary behavior, was not operationally defined. There may have been variations in the types of physical activity reported. Third, drug use was reported to be 1.36 (SEM = 0.20) days per month. However, the types of drugs taken were not controlled for, which could contribute to some of the variance noted. Forth, it is unclear exactly how much disclosure represents a high level of disclosure. Fifth, previously mentioned, the number of emotional words per essay had a low test-retest reliability index ($\underline{r} = 0.34$).

With regard to procedure, Esterling et al.'s (1990) study did not include a control group for comparative purposes. It is unknown whether a non-intervention would produce similar effects. It is unclear what role the 5-minute pre-test rest period played in determining the results of the study. Finally, though the predictor model was strong, the underlying mechanisms of change remain unknown.

Donnelly and Murray (1991)

In a follow-up study to Murray et al. (1989), Donnelly and Murray (1991) examined the changes that take place when individual deals with a traumatic event on a PW assignment. Specifically, they wanted to understand the development of cognitive, self-esteem and adaptive behavior changes. To this end, they compared the changes that take place between psychotherapy and PW.

Procedure. One hundred and two undergraduates were randomly assigned to one of four groups: (a) a written-traumatic group, (b) a written-trivial group, (c) a psychotherapy-traumatic group, and (d) a psychotherapy-trivial group (Donnelly & Murray, 1991). Participants engaged in 4 sessions over the course of four days for approximately 30 minutes. Participants in the written-traumatic group were instructed:

> Write about one of the most traumatic and upsetting experiences of your entire life. The important thing about this is that you write about your deepest thoughts and feelings. Ideally, whatever you write about should be intensely personal and dealing with an event or experience that you have not talked about with others in detail. (p. 337)

Participants in the psychotherapy condition were given these instructions, but instructed to talk, rather than write, about a traumatic event in their lives with a therapist (Donnelly & Murray, 1991). The therapists were four males and four females who were graduate students in clinical psychology with at least 2 years of experiences. Their role was "to reflect and reframe the emotional content of these descriptions back to the subject in a warm, empathic manner" (p. 337). Control participants were assigned a trivial topic to write or speak about.

Measurements. Several questionnaires were administered through the study (Donnelly & Murray, 1991). A revised form of the Nowlis Adjective Checklist was administered before and after each session. This form consisted of a list of 24 adjectives that participants rated as describing their feelings. It uses a 4-point Likert scale ranging from very well to not at all. Theoretically, the adjectives load on eight factors (aggression, fatigue, anxiety, surgency, elation, social affection, sadness, and vigor).

A principal component factor analysis produced two factors (Donnelly & Murray, 1991). The first was labeled the Total Positive Mood factor, which had several positively loaded adjectives (e.g., energetic, active, playful, pleased, vigorous, elated, overjoyed, warmhearted, carefree, witty, affectionate, and kindly) and negatively loaded adjectives (e.g., drowsy, tired, and sluggish). The eigenvalue for this factor was 6.75, and it accounted for 28.1% of the variance. The internal reliability alpha for this factor was 0.76.

The second factor was labeled the Total Negative Mood factor (Donnelly & Murray, 1991). This factor was loaded with several adjectives that included angry, fearful, sad, clutched up, sorry, rebellious, defiant, regretful, and jittery. The eigenvalue for this factor was 3.29, and it accounted for 13.7% of the variance. The internal reliability alpha for this factor was 0.73.

A pre-session questionnaire was administered the first day of the study (Donnelly & Murray, 1991). It assessed several factors: (a) the recency of the event,

(b) the degree of emotional upset and pain aroused when the topic is thought about, (c) how often the topic is thought about, and (d) how much the event has been discussed with others. On the second through forth days, the pre-session questionnaire reassessed all of these topics except recency. A post-session questionnaire was administered which inquired as to how much emotional distress and pain the participant felt about the topic.

A post-experimental questionnaire was administered at the end of the study (Donnelly & Murray, 1991). It included questions on changes in positive and negative feelings about the topic, self-esteem, cognitive, and behavior changes. The questionnaire used a 7-point Likert scale ranging from 1 (none) to 7 (very much). Reliability and validity statistics were not reported.

One of the experimenters rated all written or recorded material according to: (a) the degree of positive and negative emotion expressed, (b) evidence of cognitive change (e.g., alternative explanations explored, greater understanding of the problem), (c) self-esteem improvements, (d) the degree to which adaptive coping strategies were explored, and (e) the seriousness of the topic (Donnelly & Murray, 1991). The experimenter used the same Likert scale mentioned above. The experimenter applied these categories in the context of the individual participant.

To test the reliability of these ratings, 8 participants from each condition were randomly selected and all four of their sessions were independently scored by a second graduate student (Donnelly & Murray, 1991). A Pearson correlation was calculated for each of the four sessions with each rating, and a composite reliability coefficient for each rating was computed by averaging the four daily correlations. These average interrater reliability coefficients for the six ratings ranged from .55 (positive emotion) to .71 (seriousness of topic).

A health questionnaire was administered pre-experimentally and at a 3-month follow-up (Donnelly & Murray, 1991). On it, participants reported the number of illness visits to a health clinic in the last 3 months. They reported the number of times they felt physically ill as well as how many times they had felt "down or emotionally distressed" (p. 339) during the previous 3 months. They also reported the number of visits they had made to a mental health professional.

Results. There were five areas of analysis (Donnelly & Murray, 1991). MANOVAs were conducted on all of the data, followed by post-hoc Tukey analyses when appropriate. The first area of analysis examined the content of the sessions, using the rating scales. Both treatment groups demonstrated a greater expression of both positive and negative emotion compared to the control groups. The treatment groups also exhibited more positive changes in cognition, self-esteem, and behavioral adaptations than the control groups. Further, over the course of the 4 days, both treatment groups increased in the expression of positive emotion and decreased expression of negative emotion. Over this time period, they also demonstrated increases in cognitive and self-esteem changes and maintained behavioral changes.

The second area of analysis examined emotional changes from before to after the sessions (Donnelly & Murray, 1991). Both the psychotherapy and written expression groups exhibited a decrease in positive mood from pre- to post-session. For Day 1, the two experimental groups were significantly different from the control group, but only the written expression group continued to exhibit pre/post decreases in positive mood for the remaining 3 days. With regard to negative mood, the written expression demonstrated significant or nearly significant pre/post increases in negative mood on all of the 4 days, and most prominently on the first. Further, on Day 1, the written expression group was significantly different from the control group.

The third area of analysis examined emotional changes across the 4 days (Donnelly & Murray, 1991). Both treatment groups reported high levels of painfulness on Day 1, which steadily decreased over the next 3 days. Both groups were significantly different from the control group, but not from each other.

The forth area of analysis was the self-reported effects of the four sessions on the participants (Donnelly & Murray, 1991). The post-treatment questionnaire revealed that both treatment groups felt significantly more positive about their topic and about themselves after the study than did the control group. Conversely, the treatment groups did not feel more negative about their topic or view themselves more negatively as a result of the interventions. The written expression group reported significantly more changes in thinking compared to the control group, but did not differ from the psychotherapy group. None of the groups differed with regard to reported physical and emotional health.

The fifth, and final, area of analysis looked at differences between the individuals in the groups (Donnelly & Murray, 1991). The first variable that was examined was Private Self-Consciousness. The authors define private self-consciousness as "the degree to which an individual is aware of inner emotional experiences" (p. 336). The authors equally divided the participants into two categories: high and low private self-consciousness. However, the authors do not explain how the participants were divided on this disposition variable. The results indicated that, for individuals with a high level of awareness of their emotional experiences, more negative emotion may be aroused by psychotherapy than a PW assignment. Conversely, for individuals with a low level of awareness of their emotional experiences, more negative emotion may be aroused by a PW assignment.

The second examined variable was sex of the participants (Donnelly & Murray, 1991). In the psychotherapy condition, females expressed more negative emotion than males. Moreover, females who had not discussed their topic much with others expressed more negative emotion during sessions in the psychotherapy condition than the written expression condition. Conversely, males who had not discussed their topic much with others expressed less negative emotion during sessions in the psychotherapy condition than the written expression condition. Females reported more painfulness after psychotherapy whereas males reported more after written expression. Finally, females were more distressed about their topic after psychotherapy whereas males reported more distress after the written expression sessions. These results suggest that males who complete a PW assignment, as opposed to being in psychotherapy, may experience more negative emotion, pain and distress about their topic if they had not discussed their topic much with others. Females who complete a PW assignment rather than participate in psychotherapy may experience less negative emotion, pain, and distress about their topic.

Limitations. Regarding Donnelly and Murray's (1991) procedures, in the psychotherapy condition, being recorded could have influenced what was said or not said. As for the measures, the majority of the outcome data was based upon self-report measures, which may have been subject to demand characteristics, particularly in the psychotherapy group. The authors did not specify that the judge who rated the content of the sessions was blind to condition, potentially subjecting the data to expectancy effects. Further, the interrater reliability coefficients between the two judges' ratings were moderate. Moreover, there was no data provided to establish true construct validity. Finally, it was not explained how high and low Private Self-Consciousness was determined, challenging the reliability and validity of this classification. Thus, it is difficulty to know how to interpret the results from this classification.

Greenberg and Stone (1992)

Greenberg and Stone (1992) sought to replicate Pennebaker et al.'s (1988) findings that disclosing traumas improved physical health. They also wanted to determine whether the effects of a PW assignment would differ between writing about a previously disclosed trauma versus a previously undisclosed trauma. The authors hypothesized that, according to the inhibition theory (discussed in the Introduction), a PW assignment about a previously undisclosed trauma would produce greater health benefits than a previously disclosed trauma.

Procedure. Fifty undergraduate students were randomly assigned to one of three groups: (a) a disclosed-trauma group, (b) an undisclosed-trauma group, and (c) a control group (Greenberg & Stone, 1992). Participants in the undisclosed-trauma group were instructed to write about their "deepest thoughts and feelings … about the most traumatic and upsetting experiences of your entire life" (p. 77). Further, they were instructed to write about events "that you have not talked with others about in detail." Disclosed-trauma participants were given identical instructions with the exception of the final line (printed above), which was replaced with instruction to write about events "that you have discussed rather than something that you have kept to yourself." Participants wrote for 20 minutes on 4 consecutive days. They could write on the same or different topics each day.

Measurements. The EEM (described in Pennebaker et al., 1988) was administered as a measure of the participants' subjective perceptions of essay writing (Greenberg & Stone, 1992). Pennebaker's Negative Mood Scale, the PANAS NA and the PANAS PA (described in Pennebaker et al., 1988) were used to evaluate the immediate emotional effects of writing. Participants also completed the SMU-HQ (also described under Pennebaker et al., 1988) and the PANAS NA and PA. Illness visit data were provided by the student health center.

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The illness data consisted of the number of times each month the participants visited the center for illness (Greenberg & Stone, 1992). Participants were also asked to report the number of times they had visited private doctors for illness. For the illness visit data, a 1-month, pre-writing baseline period and a 2-month follow-up was established. Data from the 2-month follow-up were combined to obtain a more reliable measure of health outcome.

Results. Several areas of analysis were conducted (Greenberg & Stone, 1992). The authors initially examined the subjective perceptions of essay writing using a series of ANOVAs. Compared with control participants, disclosed-trauma and undisclosed-trauma participants rated their essays as significantly more personal, meaningful, and revealing of their emotions. In addition, disclosed-trauma and undisclosed-trauma participants wanted to tell other people and had held back from telling others about their events to a greater degree. Further, disclosed-trauma participants reported significantly higher levels of previous disclosure of their events to other people compared to undisclosed-trauma and control participants. There were no significant differences between disclosed-trauma and undisclosed-trauma participants in the extent to which they had previous held back from telling other people about their traumas. Average across the 4 days of writing, no significant differences between the groups were found with regard to trauma severity and current life interference.

Greenberg and Stone (1992) examined the immediate effects of essay writing. It should be noted that pre-test data were significant for the SMU-HQ and PANAS NA (p

< .14), indicating that randomization was compromised. To compensate, the authors applied analyses of covariance (ANCOVAs) using pre-test scores on the dependent variables as covariates. Pre-test and post-test scores on each measure were average separately across the 4 days of rating. Planned contrasts of adjusted means were calculated when the overall ANCOVA was significant for any given measure.

Greenberg and Stone (1992) found that, compared with controls, participants in the two disclosure groups reported more physical symptoms immediately after essay writing. With regard to negative mood, participants in the two disclosure groups reported higher levels of negative mood immediately after essay writing compared with controls. Further the disclosed-trauma groups reported higher levels of negative mood than undisclosed-trauma group. Surprisingly, the disclosed-trauma group reported lower positive mood than the undisclosed-trauma group at post-test.

Greenberg and Stone (1992) examined the effects of event severity. All of the trauma participants, both disclosed and undisclosed, were combined and divided into severe and nonsevere trauma groups on the basis of subjective ratings of trauma severity. A median split was performed on all the severity ratings across the 4 rating days. Participants with ratings of 6 or higher were placed in the severe-trauma group ($\underline{n}=19$), and participants with mean rating below 6 were placed in the non-severe trauma group ($\underline{n}=14$). ANCOVAs were calculated using pre-test dependent variable scores as covariates, with planned follow-up comparisons when appropriate. No immediate post-test differences were found between severe and nonsevere participants.

Further, differences between the severe, nonsevere, and control groups with regard to long term health and mood were examined using ANCOVAs with pre-test dependent variables as covariates. The severe-trauma group reported fewer symptoms than the nonsevere-trauma group, but did not differ from the control group. No other effects on health were found.

Greenberg and Stone (1992) wanted a more sensitive test of the association between trauma severity and outcome. To this end, Pearson partial correlations were performed between the trauma groups' mean severity ratings and post-test levels of health effects (described under the third area of analysis). Significant negative associations were found between severity and both self-reported health ($\underline{r}[33] = -0.53$) and objective health ($\underline{r}[33] = -0.41$).

Greenberg and Stone (1992) examined differences in essay content between several groupings of the data. To accomplish this, an 11-category coding system (of 11 different traumas) was formed with two considerations: the particular person or relationship involved and the content of the event. Two independent judges classified 160 disclosed- and undisclosed-trauma participants' essays into these 11 categories. All disagreements in classification were mutually resolved with discussion.

Separate chi-square tests were conducted comparing observed with expected frequencies for (a) disclosed- versus undisclosed-trauma participants and (b) severe versus nonsevere trauma participants (Greenberg & Stone, 1992). Expected values were set at 50% of the total number of essays per category in each of the two groups.

The chi-square was not significant for disclosed- versus undisclosed-trauma participants, suggesting that the number of essays in each category did not differ systematically between the two groups. However, there was a difference between the severe and nonsevere trauma groups, indicating that there were systematic differences in essay content between participants who wrote about high and low-severity traumas. Additional chi-square comparisons revealed that, compared with nonsevere trauma participants, severe trauma participants were more likely to write about death and divorce/parental conflict, but less likely to write about real or threatened physical or sexual abuse/attack.

Greenberg and Stone (1992) investigated whether there were systematic differences between study dropouts and completers. No significant differences were found on the subjective essay evaluations (e.g., how personal, meaningful). However, nonsevere trauma participants were more likely to drop out of the study than severe-trauma participants.

Limitations. The unique problems with Greenberg and Stone's (1992) study include their assessment of disclosure. Recall that in the instructions, undisclosed-trauma participants were asked to discuss a traumatic event that they had not talked with others about in detail. Variations in the participants' interpretation of the terms "others" (e.g., number of others) and "in detail" (e.g., types of detail) could account for some of the variance noted in the results. This illustrates the fallacy of using disclosure as a dichotomous, dependent variable, and generalizing from any conclusions derived from it. However, it should be remembered that disclosed-trauma participants reported significantly higher levels of previous disclosure than undisclosed-trauma participants. Finally, the differential rate of dropouts to completers (6 to 34) represented a restriction of range for severity, suggesting that the results may have underestimated the relationship between severity and outcome.

Spera, Buhrfeind, and Pennebaker (1994)

Spera, Buhrfeind, and Pennebaker (1994) investigated the effects of PW when applied to a specific stressor, the loss of employment. They hypothesized that unemployed professionals who engaged in an emotionally-disclosing PW assignment would experience greater positive affective changes than unemployed professionals who did not engage in this exercise. They hypothesized that a PW assignment would produce cognitive changes such that unemployed professionals would demonstrate an increase in their motivation to obtain employment. They also hypothesized that a PW assignment would result in greater success in obtaining re-employment.

Procedure. Sixty-three middle-aged professionals who had recently been laid off from work participated in the study (Spera et al., 1994). The professionals had a mean age of 54 years and an average tenure of 20 years with their former employer, a computer and electronics firm. The participants held engineering and other professional positions at the company.

Five months after being laid off, 41 of the participants were volunteers and were randomly placed in either an experimental-writing group or in a control-writing group

(Spera et al., 1994). A third group of volunteers, who were unable to participate in the writing groups because of scheduling conflicts, was formed as a nonwriting control group. Several analyses revealed that the participants did not differ with regard to age, gender, or race. Further the Transition-Search Behaviors Questionnaire demonstrated that the groups did not differ with regard to their initial self-ratings or their consultants' rating of them on their search-related behaviors.

Measurements. A week before the experiment began, participants completed an unnamed questionnaire, which was composed of items lifted from the PILL and the SMU-HQ, and a Transition-Search Behavior Questionnaire (TSBQ; Spera et al., 1994). The TSBQ is composed of 12 face-valid items regarding job search activity, motivation, and anxiety levels in a career transition period ($\alpha = .87$). Additional items inquired about specific behaviors occurring in the week prior to completing the questionnaire (e.g., alcohol consumption). Participants had their age, height, weight, blood pressure, and heart rate recorded.

A week later, experimental participants were instructed to write "about their deepest thoughts and feelings surrounding the layoff and how their lives, both personal and profession, had been affected" (Spera et al., 1994, p. 725). The writing control group, or nontrauma group, wrote about "their plans for the day and their activities in the job search." The nontrauma group was specifically told "to report plans and avoid revealing opinions or feelings about their situation." Each participant wrote for 5 consecutive days, for 20 minutes each day.

Following each writing session, participants completed a "daily writing questionnaire" (Spera et al., 1994, p. 725) that tapped various physical symptoms and negative moods. (Note: This questionnaire was not listed as Pennebaker's Negative Mood Scale or Pennebaker's Physical Symptom Scale.) Additional questions also assessed how personal the participants' writing was each session and how much emotion they had revealed.

On the fifth day of writing, participants also completed a "final writing day questionnaire" (Spera et al., 1994, p. 725). This questionnaire included questions regarding the participants' feelings during the experiment. Participants also completed the TSBQ. Twelve days later, they returned to have their blood pressure, heart rate, and weight recorded, and they filled out the TSBQ again. This last process was repeated during the last week of each of the next 3 months.

Several additional pieces of data were collected prior to and throughout the study (Spera et al., 1994). Participants turned in interview logs to their outplacement consultants, with whom they met periodically. The outplacement consultants also completed the TSBQ with regard to the participant with whom they were working. The correlation between the questionnaires ($r[55] = .62$) suggests construct validity of the self-report questionnaire. The outplacement center also provided records of the number of phone calls received by all clients and of the number of job-related letters generated by clients. Spera et al. applied this information as an indicator of job search activity.

Results. There were three areas of analysis: (a) effects on employment, (b) essay content, and (c) individual differences (Spera et al., 1994). The first area of analysis was the effect of the intervention on employment. The experimenters used a between condition ANOVA and orthogonal contrasts using the mean-square error term on employment status to examine the data. After 8 months, writing-experimental participants were more likely to obtain full-time employment than either the writing control participants or the nonwriting control participants. The two control groups did not differ from one another. When all types of jobs (e.g., full-time, part-time, and contract) were considered, writing participants were significantly more likely to obtain employment than non-writing control participants. However, the writing control group did not differ from either the experimental participants or the nonwriting control participants, suggesting that writing itself was helpful in obtaining some type of employment.

The second area of analysis was essay content (Spera et al., 1994). T tests were conducted on the daily questionnaires. Experimental participants rated their essays as more personal and more revealing of their emotions than did control participants.

The third area of analysis was individual differences between the essays using ANOVAs (Spera et al., 1994). At pre-test, no differences were found on measures of job search-related activities, energy levels, motivation levels, frustration and anxiety levels, and personal behaviors. Six weeks after the experiment, experimental participants reported drinking slightly less alcohol than did control participants ($p <$ .058). No other significant differences were found.

Limitations. Spera et al.'s (1994) study is limited by the nature of its relatively small sample ($n = 63$). In fact, follow-up data was from a smaller sample due to the fact that participants who became re-employed were not available in the months following the intervention. Further, the sample was overwhelmingly composed of men (62 men, 1 woman) who were middle-aged engineers. As the authors stated, the sample was "at least stereotypically, not very emotionally expressive and might particularly benefit from a structured intervention designed to get them to express themselves" (p. 713). It is unknown how this intervention would impact different personalities.

In addition, the influence of the participants' consultants could account for some of the variance in the findings (Spera et al., 1994). Moreover, the authors do not mention whether they controlled for external factors, such as additional psychological treatment the participants may have received. The results are also limited to a specific trauma, being laid of from work after a significant amount of time at a single workplace.

Esterling, Antoni, Fletcher, Margulies, and Schneiderman (1994)

Esterling, Antoni, Fletcher, Margulies, and Schneiderman (1994) sought to replicate the interpersonal coping style data from their previous study (Esterling et al., 1990) that demonstrated a relationship between higher EBV reactivation and participants classified as repressors. They also wanted to determine whether experimentally manipulating emotional expression through PW and Programmed Speaking (PS) would influence EBV antibody titers. (PS is conceptually similar to PW, using spoken rather than written assignments. Because the focus of this paper is PW, PS will not be discussed in detail.) They investigated the differences in EBV responses following verbal disclosure versus written disclosure of traumatic events. Finally, they investigated whether EBV antibody titer response would be influenced by several variables, such as the seriousness of the disclosed event, cognitive changes, self-esteem improvements, and discussion of adaptive coping strategies.

Procedure. Fifty-seven undergraduates were randomly assigned to one of three conditions: (a) a written disclosure of stressful events condition (PW), (b) a verbal disclosure of stressful events condition (PS), and (c) a trivial writing condition (Esterling et al., 1994). Participants in each of the first two conditions were instructed to "recall and focus on a stressful event that had happened to them and that they had not disclosed to many people" (p. 132). The authors stressed that they should select a topic that they "felt was highly stressful or traumatic or about which they felt very guilty." Participants were to write an essay or speak into a tape recorder as if they were communicating with "someone they could trust." All participants completed three, weekly, 20-minute sessions.

Measurements. At baseline, all participants completed the MBHI and were classified as Repressors, Sensitizers, or NPs (Esterling et al., 1994; see Esterling et al., 1990, for a full description, including reliability and validity data). Self-reports on a number of health-related behaviors were also collected. Participants with potentially immunomodulatory behaviors were excluded from the study.

Tape recordings of the PS sessions were transcribed (Esterling et al., 1994). Two independent judges rated the essays (written and spoken), and computed the percentages of total emotional words. Two emotional expression indices, a positive and a negative, were computed. No reliability or validity statistics were reported on the two emotional indices. Recall from Esterling et al. (1990) that a similar measure, one of emotional repressiveness, did not appear reliable over the course of a month.

The judges rated the essays on several dimensions of interest using a 7-point scale ranging from 1 (none) to 7 (very much) (Esterling et al., 1994, p. 132). The dimensions were: (a) positive cognitive appraisal change (e.g., were alternative explanations discussed and to what degree, or was there evidence of better understanding of the problem and to what degree?), (b) self-esteem improvements (e.g., was there evidence that the participants felt better about self, or less down on self, and to what degree?), and (c) adaptive coping strategies discussed (e.g., was there evidence that the participant expressed feelings to people, became more assertive, or took more interpersonal risks?). High scores were given when behavioral examples were explained. Low scores were given if there was no explicit evidence in the essay or if the dimension was addressed only implicitly. In addition, the seriousness of event was

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rated. The level of seriousness of was based upon the participants' subjective report of the event, not the judges' opinion.

All of the judges' ratings were averaged at each time point (Esterling et al., 1994). An advanced clinical psychology graduate student then randomly selected 5 participants and scored their essays for all three sessions. A Pearson correlation was calculated for each of the three sessions with each rating. A composite reliability coefficient for each rating was calculated by averaging the three obtained weekly correlations. Average interrater reliability coefficients for the six ratings ranged from 0.78 to 0.95. Although the ratings appear to have face validity, no statistical information regarding validity was presented.

The authors used antibodies against EBA-VCA and EBA-EA as markers of immune response (Esterling et al., 1994). Blood samples were collected 1 week prior to the initial intervention and at the same time of day 1 week following the last intervention. All participants were determined to be EBV seropositive.

As a means of controlling the data, all participants were determined to be not undergoing a primary viral infection, which would produce significantly different antibody levels than a secondary infection (Esterling et al., 1994). Further, a stepwise multiple regression revealed that none of the health-related behaviors, lean body mass, or sex accounted for a significant amount of the variance in baseline EBV-VCA titer variability. ANOVAs and chi-square analysis revealed that none of these variables differed among groups classified by either personality or treatment condition.

Results. Esterling et al. (1994) initially examined essay content. ANOVAs were calculated followed by Tukey post hoc tests, when appropriate. It was found that PW and PS participants disclosed highly personal and upsetting experiences (e.g., death of a loved one, divorce, break-up of a romantic relationship) and reported more serious events than their control counterparts. The frequency of these themes and the seriousness of the events disclosed did not differ between the written/stressful and verbal/stressful disclosure groups.

The PS group demonstrated significantly greater evidence of cognitive change compared with the PW group (Esterling et al., 1994). Both groups evidenced greater change compared with the control group. Further, the disclosures of the PS group were rated significantly higher on self-esteem improvement, compared with those of the PW and control groups, which did not differ from each other. The PS group's disclosures were rated as containing significantly more adaptive coping strategies than those of the PW and control groups, which did not differ from each other.

With regard to emotional expression, the PS participants expressed significantly more words per session, compared to the PW and control participants, who did not differ from each other (Esterling et al., 1994). The totals of emotional words were converted to percentages for comparison. The PW participants expressed significantly more total and negative emotional words than the PS and control participants. The PW participants also expressed significantly more positive emotional words than the PS group at each time point.

ANOVAs were used to analyze the immunological data from several perspectives (Esterling et al., 1994). With regard to correlates with personality types, there were significant differences on pre-intervention EBV antibody titer among the three personality classifications. Repressors had significantly higher levels of EBV antibody titers than the NP and Sensitizer groups. The NP and Sensitizer groups did not differ from each other. As with Esterling et al.'s (1990) previous study, these results suggest that greater immune response on a PW assignment will be seen in two groups of individuals who do not deny negative feelings to themselves and others.

Esterling et al. (1994) then looked at experimental effects on the immunological data. At baseline, participants in each group were equivalent with respect to EBV-VCA antibody levels. Over the course of the 4-week study, the PW and PS participants demonstrated a significant decrease in antibody titer levels to EBV-VCA. Control participants' antibody levels did not change. Three weeks after the conclusion of the study, the control group had significantly higher antibody titers to EBV-VCA than the PW participants, whose antibody titers were significantly higher than the PS participants.

Several variables entered into a hierarchical multiple regression model accounted for 53.2% of the variance in EBV antibody titer change (Esterling et al., 1994). Experimental group assignment was the most significant predictor, followed by personality style. Sensitizers demonstrated greater decreases in antibody titers than repressors over the course of the study. Increases in the number of expressed negative emotional words over the intervention significantly predicted greater decreases in EBV antibody titer levels. Finally, greater cognitive change, enhanced self-esteem, and seriousness of event predicted greater decreases in EBV antibody titers.

Limitations. It should be kept in mind that Esterling et al.'s (1994) sample consisted of young, undergraduate students who demonstrated a slightly compromised immune system at baseline. Though self-reports of immunomodulatory behaviors and chronic illnesses were collected, the findings could have been influenced by demand characteristics, particularly desirable behaviors and traits. Because of the ambiguous nature of the instructions given to the trauma group, several unaccounted factors could have contributed to the results. For example, the authors did not control for the types of events discussed (e.g., a traumatic event versus something about which they felt very guilty), the amount of people with whom the topic was discussed (e.g., not many people), and the amount of time since the trauma took place.

With regard to the EBV-VCA antibody titers, Esterling et al.'s (1994) sample appeared to have slightly elevated means at baseline. Though these levels were not indicative of immunosuppressive diseases or therapies that affect the immune system, they were most likely due to the psychological stressors of being a college student. This reinforces the external validity problems of using a college population.

Petrie, Booth, Pennebaker, Davison, and Thomas (1995)

Petrie et al. (1995) sought to extend previous study on PW and immunity to deteremine whether the immunity changes observed after PW could have significant health consequences. When a series of three hepatitis B vaccinations is administered over a period of several months, an antibody response occurs in at least 90% of healthy adults. Research has suggested that psychological factors, such as stress, can influence the response to hepatitis B vaccination (Glaser et al., 1992). Further, higher seroconversion rates after a hepatitis B vaccination has been significantly related to lower levels of anxiety and perceived stress. Petrie et al. investigated whether expressing emotions through a PW assignment about traumatic experiences would influence immunological response to a hepatitis B vaccination program.

Procedure. Forty third-year medical students, all of whom initially tested hepatitis B negative, were randomly assigned to a traumatic writing group or a trivial group (Petrie et al., 1995). The traumatic group was instructed to write about "the most traumatic and upsetting experiences of your whole life. ... Ideally, whatever you write about should deal with an event or experience that you have not talked about with others in detail" (p. 788). Control participants were asked to write "in a purely descriptive and objective way with minimum use of emotions." Participants wrote for 4 consecutive days. The length of these sessions was not reported.

Measurements. Several physiological measures were collected (Petrie et al., 1995). Blood was collected on the day after completion of the fourth day of writing, which was immediately before the participants' first hepatitis B vaccination. Blood was also collected at the same time of day immediately before the 1 and 4-month vaccinations and at a 6-month follow-up. Several data were derived from the samples:

(a) lymphocyte surface markers (e.g., to measure the presence of immunity), (b) natural killer (NK) cells, and (c) hepatitis B antibodies. In addition, SCLs were measured continuously during the writing sessions using the CARMEN software problem, which allows the linking of typed text with measures of autonomic activity. No statistical information on the CARMEN was reported.

Immediately before and after each writing session, participants completed Pennebaker's Negative Mood Scale (Pennebaker, 1982) and Pennebaker's Physical Symptom Scale (Petrie et al., 1995). After the writing session, participants also completed the EEM. Finally, an objective measure of essay content was obtained using the Linguistic Inquiry and Word Count (LIWC) text analysis program. This program analyzes text on a word-by-word basis and classified words into four high-level categories comprising emotional expression, cognitive strategies, content domains, and language composition. No statistical information on the LIWC was reported.

Results. There were three areas of analysis (Petrie et al., 1995). All of the data were analyzed using a series of ANOVAs, with follow-up tests, when appropriate. The first area of analysis examined the essay content. Compared with controls, the PW group expressed more negative emotions, anxiety, and depression. The PW group also used a higher amount of insight words, causation, and acceptance (all classified as cognitive strategies). Further, PW participants rated their writing as more personal, meaningful, and revealing of topics they had held back from discussing, compared with controls.

The second area of analysis was psychological changes and physical symptom reports after the intervention (Petrie et al., 1995). Immediately after writing, PW participants reported significantly higher levels of sadness and guilt compared with controls. They also reported significantly higher instances of heart pounding. Finally, SCL exhibited a steady decline over the 4 writing days for PW participants, whereas the mean SCL for controls decreased initially decreased, but increased toward the end of the writing sessions.

The third area of analysis was on changes in immune variables (Petrie et al., 1995). The experimenters re-tested their sample for hepatitis B, using a more sensitive test than the initial screener. Five participants (2 controls and 3 PW) were found to have low, but detectable levels of anti-hepatitis B antibodies before the first vaccination. To control for the differences these participants might introduce to the data, the authors standardized log hepatitis B antibody concentrations at each of the post-writing periods separately for the 35 participants with no previous hepatitis B antibodies and 5 participants with low initial antibody titers.

These standardized scores were subjected to a series of ANOVAs (Petrie et al., 1995). They indicated that the PW group had increasingly higher levels of hepatitis B antibodies over time compared with control participants. The same pattern was observed when the initial status of the participants (e.g., antibody negative vs. antibody positive) was factored in. However, when the 5 antibody-positive participants were excluded from the analysis, the effects were not significant.

In other analyses, it was found that, compared with the control group, the treatment group demonstrated significantly reduced numbers of CD4 (T helper) lymphocytes and circulating basophils immediately after the forth day of writing (Petrie et al., 1995). However, these differences were not apparent by the time of the second blood sample, which was collected 1 month later. Further, there were no significant associations between these short-term immunity effects and the long-term antibody changes produced by the vaccination.

Limitations. The effects on the hepatitis B antibodies was only significant when medical students who had already been exposed to hepatitis B were included in the sample (Petrie et al., 1995). It is does not appear to be effective for normal, healthy adults (even adults who are presumably under stress). Finally, the length of the writing sessions was not specified.

Greenberg, Wortman, and Stone (1996)

Greenberg et al. (1996) expanded on previous PW/disinhibition research by investigating whether the effects of a PW assignment involving an imaginary trauma would produce the same physiological changes and health benefits as a PW assignment involving a real trauma. The underlying logic behind this question is that traumas that are encountered for the first time could not, by definition, have been subjected to previous inhibition. If the results were identical, any health improvements would suggest that expression of previously suppressed affect is not necessary for health enhancement via a PW disclosure assignment.

Procedure. The Greenberg et al. (1996) sample was composed of undergraduate women, all of whom had to have experienced a real trauma approximately 5 years prior to the study. Greenberg et al. state:

> Inclusion criteria were the experience of one of the following traumas or another event subjectively perceived as comparably severe: physical abuse, sexual molestation, rape, death or life-threatening illness of a parent, family violence, a life-threatening injury or accident, violent assault, abandonment by a parent, parental divorce, and witnessing a gruesome event. (p. 590)

Ninety-seven undergraduate women were randomly assigned, within design limits, to a real-trauma group, an imaginary-trauma group, or a control group (Greenberg et al., 1996). The groups were composed of up to four people. Because imaginary-trauma groups were yoked to real-trauma participants by event topic, the authors initially collected data from three groups of real-trauma participants (n = 9). Then, the researchers randomly assigned the remaining participants to the groups. All participants wrote for a single 30-minute session.

Both experimental groups were told: "I am now going to give you a test of your imaginative and emotional capacities. People who are imaginative and really in touch with their emotions generally do very well at this task" (Greenberg et al., 1996, p. 590). Real-trauma participants were told, "The aim of this exercise is for you to mentally recreate the most traumatic event that has ever happened to you."

Imaginary-trauma participants were presented with written descriptions of their assigned events, which consisted of factual summaries of a real trauma experienced by a real-trauma participant (Greenberg et al., 1996). The summaries had been rewritten by a professional writer to enhance clarity and eliminate emotional references. After reading the event, they were told:

> The aim of this exercise is for you to mentally recreate an imaginary traumatic event, especially the emotions associated with this event. ... Close your eyes and try to imagine yourself actually experiencing the event you have just read. Let your imagination carry you away from this imaginary situation as vividly and fully as you can. (p. 590)

Greenberg et al. (1996) then instructed both groups:

> I want you to explore the full extent of your feelings associated with this traumatic experience by writing them down. ... Describe as vividly and fully as possible all of the thoughts and feelings that you have when you imagine this experience. As you write sink into your feelings more and more. Do not write about your emotions in general, but rather about how you responded emotionally to this particular event. (p. 590)

Control participants were instructed to:

> Visualize the [university] campus. ... Write down as many factual details as you can about the campus. ... It is important that you write down only factual details without describing any opinions or emotions. ... Your essays should be as clear, detailed, and objective as possible. Remember, we are interested in facts, not feelings. (Greenberg et al., 1996, p. 591)

Measurements. Several types of measures were used in Greenberg et al.'s (1996) study. The first set of measures was used for manipulation checks and essay evaluations. Participants reported whether they were currently participating in psychotherapy. They also completed the Assessment of Past Traumas (APT), an instrument developed by the first author. On it, participants reported which of 45 traumas they had experienced and rated the severity of the traumas, on a 7-point Likert scale ranging from 1 (not at all) to 7 (extremely). Items were selected on the basis of the more severe traumas reported in previous trauma studies.

Another instrument in this set was the Assessment of Prior Disclosure Questionnaire (APD; Greenberg et al., 1996). Greenberg et al. described it as a

> rough index of event-specific inhibition. Participants were asked to describe their most traumatic experience, to state the date of its occurrence, to specify whether it had been disclosed, and, if it had been disclosed, to specify the date of initial disclosure. Participants were assigned a categorical inhibition rating on the basis of the length of time elapsed between the trauma and initial disclosure. (p. 591)

Participants also completed subjective essay evaluations (Greenberg et al., 1996). Using a 7-point Likert scale ranging from 1 (not at all) to 7 (a great deal), participants rated the degree to which their essays were

> personal, traumatic, and revealing of their emotions, and the extent to which their essays reflected each of the following: an actual personal experience, a made-up or imaginary event, an event experienced by somebody they knew, an event that they had read about or seen on television or in a movie, and something that they had previously fantasized about. Participants also indicated whether they had actually experienced the event written about by using a dichotomous yes-no scale. (p. 591)

In addition, the experimenters counted the number of words in each essay (Greenberg et al., 1996). Furthermore, two judges, both blind to the study, determined which essay in each yoked pair had been written by the real-trauma participant. Percentage agreement between the raters was 75%. Though all of the above measures appear to have face validity, no reliability or statistical information was reported. The APT and APD were completed before the intervention and the essay evaluations were completed after the intervention. The psychotherapy indicator was completed weekly for 4 weeks following the essay writing.

The second set of measures evaluated physical health, and was completed weekly for 4 weeks following the essay writing (Greenberg et al., 1996). They included three questionnaires: (a) the Upper Respiratory Symptom Scale, which consisted of nine items; (b) the Musculoskeltal Symptom Scale, which consisted of three items; and (c) the Miscellaneous Symptom Scale, which consisted of 12 of 13 general health items taken from the SMU-HQ (Watson & Pennebaker, 1989). Participants responded positively or negatively to indicate whether each symptom had been present in the previous month (at pre-test) or week (at post-test).

An activity restriction measure was taken (Greenberg et al., 1996). In assessed the extent to which participants' work and social activities were disrupted by illness during the previous week (or month at pre-test). Activity restriction was calculated as the total number of items checked as occurring.

Information regarding the number of visits to physicians for illness was provided (Greenberg et al., 1996). Visits for allergies, check-ups, and injuries were not included. Visits made at pre-test and post-test were calculated separately for each participant on the basis of the actual dates of experimental participation.

The third set of measures tapped psychological constructs (Greenberg et al., 1996). They included the Impact of Event Scale (IES; Horowitz, Wilner, & Alvarez, 1979), which was completed at post-test weeks 1 and 4. The IES assesses two categories of response to a specific past trauma: intrusion (intrusively experienced ideas, images, feelings, or bad dreams) and avoidance (consciously recognized avoidance of specific ideas, feelings, or situations). The IES contains a list of 15 situations (e.g., I had waves of strong feelings about it) and participants indicate how frequently each response was experienced in the past 7 days. The IES uses a 4-point scale that ranges from 0 (not at all) to 5 (often; with responses of 0, 1, 3, and 5). Intrusion and avoidance scores are the sums of the relevant item subsets. Cronbach's alphas have ranged from .79 to .92 for intrusion and from .82 to .91 for avoidance (Zilberg, Weiss, & Horowitz, 1982). A manipulation check confirmed that real-trauma participants reported on the IES about their reactions to the same events described in their essays.

Greenberg et al. (1996) also used the Naval Health Research Center Mood Questionnaire (NHRC; Vickers & Kusulas, 1989). The NHRC was developed to assess the relationship of mood to illness in naval recruits. It assesses several moods varying along dimensions of hedonic quality (fearful, angry, depressed, happy) and activation (active, fatigued). Participants rate 40 moods using a 5-point Likert scale ranging from 1 (not at all) to 5 (very much). Items are summed to form six mood scales (i.e., active, angry, depressed, fatigued, fearful, and happy). Participants rated their present mood immediately pre- and post-test, and rated their mood during the previous week on the weekly follow-up versions.

Greenberg et al.'s (1996) final psychological measure was The Symptom Checklist-90 (SCL-90; Derogatis, 1977). The SCL-90 is composed of 90 items describing psychiatric symptoms and allows participants to indicate, using a 5-point scale ranging from 0 (not at all) to 4 (extremely), the degree of discomfort each problem had caused them in the past week. The global symptom severity is the sum of the item severity ratings. Mikulincer, Florian, and Weller (1993) found that Cronbach alphas for college students exposed to a trauma ranged from .82 to .93.

Results. There were six areas of analysis in Greenberg et al.'s (1996) study. The first area focused on the characteristics of the essays and manipulation checks. This information served as a backdrop for interpreting the remaining data. APT severity ratings indicated that 82% of the real-trauma group wrote about their most traumatic experience. Only 1 of 32 imaginary-trauma participants (3%) reported previous experience of her assigned event. Reanalysis with this individual's data removed did not substantively alter the results obtained with the entire imaginary-trauma group. Two of 97 participants reported participation in psychotherapy and they were both in the control group. Their data were eliminated to provide stricter control for the writing intervention.

For the second area of analysis, Greenberg et al. (1996) conducted a series of ANOVAS in order to find group differences in essay perception and essay content. They found that the real-trauma group rated their essays as significantly more personal, traumatic, and revealing of their emotions than did the imaginary-trauma group, whose ratings were significantly higher than the ratings of the control group. The real-trauma group rated their essays as reflecting an actual past experience to a greater degree than did the imaginary-trauma group, who perceived their essays as reflecting imaginary events that they learned of through the media. In addition, the two groups rated their essays as similarly reflective of incidents that had happened to other people whom they knew. Moreover, on average, the imaginary-trauma group assigned moderate ratings to each identified content area, suggesting that their essays were based on actual, imaginal, and vicarious experiences.

The blind judges were able to discriminate yoked real- and imaginary-trauma essays with some success (Greenberg et al., 1996). On average, 26 of 32 essays pairs (81%) were correctly categorized, a greater accuracy than would be expected by chance as determined by a chi-squares test. No significantly differences were found between the groups with regard to number of words per essay.

The third area of analysis was the immediate effect of writing the essays (Greenberg et al., 1996). Multivariate analyses of covariance (MANCOVAs), with pre-test scores as covariates, were conducted to assess between group differences in sets of variables. If they were significant, ANCOVAs were applied to determine between group differences in individual variables, followed by planned contrasts, when appropriate. Compared with the control group, the trauma groups reported significantly more intense, fearful, angry, and depressed moods. They also reported less intense positive mood.

The fourth area of analysis was the long-term effect of writing the essays (Greenberg et al., 1996). Participants in the two trauma groups had fewer illness visits at follow-up than participants in the control group. Further, chi-squared tests revealed that the presence of illness visits was related to group at follow-up, but not at pre-test. This would suggest that individuals may benefit from using a real or imaginary trauma in a PW assignment.

The participants' four weekly report data were examined separately (Greenberg et al., 1996). The real-trauma group displayed significantly decreasing upper respiratory symptoms. Control participants displayed significantly increasing upper respiratory symptoms across the 4 follow-up weeks.

The fifth area of analysis examined whether the health changes in the two trauma groups were achieved through similar or dissimilar process (Greenberg et al., 1996). A series of partial Pearson correlational analyses were computed to determine the relationship of immediate essay perception and mood variables to long-term health outcomes within each trauma group. Pre-test health was controlled. The criterion variables were illness visits, upper respiratory symptoms, musculoskeletal symptoms, and miscellaneous symptoms. The scores were averaged across the 4 follow-up weeks. The predictor variables were as follows: (a) the participants' rating of the degree to which their essays were personal, traumatic, and emotionally revealing; (b) negative mood at immediate post-test (calculated as the sum of angry, depressed, and fearful moods); and (c) negative mood at follow-up (averaged across the 4 follow-up weeks). No significant relationships were found.

Imaginary-trauma participants who had greater negative mood immediately at post-test displayed fewer upper respiratory symptoms at follow-up ($r[32] = -0.36$, $p <$

.05; Greenberg et al., 1996). Further, imaginary-trauma participants who reported greater negative mood at follow-up reported more miscellaneous symptoms ($r[32] = 0.50$, $p < .01$) and marginally greater illness visits ($r[32] = .26$, $p < .15$).

The sixth, and final, area of analysis was the long-term psychological effect of writing the essays (Greenberg et al., 1996). The real-trauma group reported significantly more avoidance at follow-up than the imaginary and control groups, which did not differ from one another. In addition, the real-trauma group reported significantly more fatigue than the imaginary-trauma and control groups, which did not differ from one another.

Limitations. The external validity of the results is challenged by the sample, which was composed of healthy young women who have experienced a real trauma in their life (Greenberg et al., 1996). There were several unstandardized instruments used. For these instruments, issues of reliability and construct validity are questionnable.

There were also some imperfections in the data analysis (Greenberg et al., 1996). For example, for number of illness visits, two outliers were re-calibrated to the next most extreme scores for analysis. (Prior to recoding, group differences in illness visits were only slightly significant [$p < .10$].) Theoretically, these two outliers could have represented a significant trend. This trend would indicate that the real and imaginary group did not produce a decrease in illness visits relative to the control group.

Regarding the effects of the interventions, it should be noted that the participants' base-rates for physician visits were very small, possibly exaggerating the intervention's effect on this variable (Greenberg et al., 1996). Moreover, their health improved after a single writing session. It is suggested that these women, who had met college goals in spite of having experienced a trauma, may have already possessed strong adaptive coping skills. Experimental knowledge of group assignment and the nature of the instructions may have produced demand characteristics. Finally, follow-up data were limited to 1 month.

Booth, Petrie, and Pennebaker (1997)

Booth, Petrie, and Pennebaker (1997) replicated their previous study that examined the effect of a PW assignment on immunity (Petrie et al., 1995). They examined both sets of data for the influence of PW on buffering and stabilizing fluctuations in immune variables. (Petrie et al., 1995, will be referred to as Study 1; Booth et al., 1997, will be referred to as Study 2.) In addition, they explored the underlying processes that occur during a PW intervention.

Procedure. Medical students (40 in Study 1; 38 in Study 2) were randomly assigned to an emotional writing group or a control writing group (Booth et al., 1997). Participants in the emotional writing group were instructed:

> Write about the most traumatic and upsetting experiences of your whole life ... The important thing is that you write about your deepest thoughts and feelings. Ideally, whatever you write about should deal with an event or experience that you have not talked with ours about in detail. (p. 24)

Participants in the trivial condition were instructed to write about different aspects of their use of time " in a purely descriptive and objective way with minimal use of emotions" (p. 24). Participants wrote for 20 minutes a day in a small, darkened basement room using a personal computer. The procedure was repeated of the course of 4 days.

Measurements. Before the study began, the participants completed the Life Orientation Test (which measures dispositional optimism), Sense of Coherence Scale (which addresses the meaningfulness, comprehensibility and manageability of a person's life), the PANAS (which evaluates positive and negative affective traits), and the PILL (a general physical symptom inventory; Booth et al., 1997). Before and after each writing session, brief questionnaires were administered that assessed positive mood (happy, contented), negative mood (nervous, sad, guilty, fatigues, constrained and anxious), and physical symptoms (racing heart, pounding heart, upset stomach, headache, dizziness, shortness of breath, cold hands, sweaty hands). In addition, after each session, participants completed the a writing evaluation measure, on which they reported the extent to which their writing was personal, meaningful, revealing of their emotions, and how much they had held back from previously discussing this material with others. Though these questionnaires closely resemble those used in previous studies (Pennebaker et al., 1988; Pennebaker & Beall, 1986), they were not mentioned by name, nor was statistical information reported.

In Study 1, blood samples were drawn on the day after the 4 days of writing and then 1, 4, and 6 months later (Petrie et al., 1995). In Study 2, blood samples were drawn once a week for 5 consecutive weeks (Booth et al., 1997). The first two draws were in the 2 weeks previous to the writing intervention, the third on the fourth day of writing (after writing), and last two in the 2 weeks following the intervention. A laboratory process determined proportions of mononuclear cells in the blood bearing the markers CD4 (T helper lymphocytes) and CD8 (T cytotoxic/suppressor lymphocytes).

Results. Booth et al. (1997) had two areas of analysis. ANOVAs, followed by planned post-hoc tests were used to examine both areas. The first area of analysis examined the participants' ratings of the essays and their self-reported responses to it. In both studies, participants in the emotional disclosure groups rated their writing to be more personal, meaningful, revealing of their emotions, and that they wrote about topics which they had held back from discussing with others, but had wanted to tell others about (Petrie et al., 1995). Further, participants in the emotional writing group reported significantly more negative mood, physical symptoms, and less positive mood after the writing sessions.

The second area of analysis looked at the immunological markers (Booth et al., 1997). In both studies, control participants demonstrated higher numbers of circulating CD4 cells, CD8 cells, and total lymphocyte numbers after the writing intervention than did the emotional disclosure participants (Petrie et al., 1995). Combined data from both studies showed that females had higher CD4 numbers than males. There were no observable differences accounted for by factors related to sex, personality, mood, or physical symptoms.

In Study 2, the two blood samples that were drawn in the 2 weeks prior to the writing intervention were examined to establish a baseline (Booth et al., 1997). CD4 numbers did not differ with regard to time or writing condition. In Study 1, the final blood sample collected 6 months after the intervention demonstrated no significant differences in CD4 numbers between conditions. Combined, these samples from Study 1 and 2 showed no significant differences in CD4 numbers between them.

The authors were unable to explain the observed increase of lymphocytes in the control group (Booth et al., 1997), but they did offer an explanation of the absence of change in the experimental group:

> We have previously hypothesized that there is a 'harmony of purpose' relating immune and psychological behaviour and as a consequence, integrating or making sense of emotional experiences by constructing a more coherent framework through the disclosure process might have an effect of stabilizing fluctuations in immune variables over time. (p. 28)

With this interpretation, written emotional disclosure appears to produce a buffer against normal increases in circulating lymphocytes.

However, the observed increase in circulating lymphocytes is contrary to previous findings (Petrie et al., 1997). The authors state:

> It should ... be borne in mind that this study was conducted using healthy volunteers and that increasing an immune variable ... beyond its optimum may not be an indication of a healthy effect. ... In our previous study, stable circulating lymphocyte numbers in the emotional disclosure group were found to correspond with a better response to hepatitis B vaccination. Thus, stability of

> circulating lymphocyte numbers over time in this context may well be indicative of relative immunological health. (p. 28)

Limitations. Limitations unique to this study include a small sable and the absence of a nonintervention control group, which may have helped the authors interpret their findings (Booth et al., 1997). Further, participants used a computer to write their essays, which may involve a different process than hand-written essays. Further, follow-up data are limited to 6 months for Study 1 and two weeks for Study 2.

Cameron and Nicholls (1998)

Cameron and Nicholls (1998) sought to assess the effectiveness of PW designed to develop self-regulatory coping strategies. A PW assignment specifically designed to enhance problem-solving skills was predicted to produce more beneficial effects than a PW assignment designed only to be a disclosure task. Further, they investigated the differences in the effect of PW on optimists and pessimists.

Procedure. One hundred and twenty-two first-year, undergraduate students engaged in three, weekly, PW sessions (Cameron & Nicholls, 1998). Each session lasted 20 minutes. Eighty-nine of the 122 participants were women. The majority was Caucasian (87%) and 18 years of age (80%). The experimenters explained that the study was aimed to "explore the lifestyles and concerns of incoming college students" (p. 87).

Participants were randomly assigned to one of three groups (Cameron & Nicholls, 1998). The first was a disclosure group, in which participants were asked to write about their "deepest thoughts and feelings about coming to college" (p. 86).

Further, they were given several issues to consider (e.g., leaving parents, identity development).

The second was a self-regulation group (Cameron & Nicholls, 1998). In the first session, participants were asked to write "about their deepest thoughts and feelings regarding problems in coming to college" for 15 minutes. For the remaining 5 minutes, they were instructed to list three things that they could do that would help them deal with one of more of the problems they discussed. Participants in this group also wrote their coping strategies on a reminder slip to take with them and to bring back with them to the next PW session.

For the second and third sessions, self-regulation participants engaged in three self-regulation tasks (Cameron & Nicholls, 1998). For the first 15 minutes, they wrote about college-related problems (the disclosure task). Then, for each problem, they listed the coping strategies identified in the previous session and indicated: (a) whether they had tried them; (b) if they had, to what extent it was helpful; and (c) if they had not tried, then why not (the appraisal task). During the last 5 minutes, they listed three actions for dealing with college-related problems, which could have been strategies they had listed previously (the revision task). Participants again wrote their coping strategies on a reminder slip and brought it back with them to the third session.

Participants in the control condition were instructed to write about trivial topics (Cameron & Nicholls, 1998). Control topics included what they had done since waking up in the morning and their plans for the rest of the day. They were instructed to "describe these events exactly as they occurred and not to mention their emotions, feelings, or opinions about them" (p. 86).

The experimenter returned to the room after 15 minutes to announce that 5 minutes remained (Cameron & Nicholls, 1998). Participants were asked not to discuss the session with others. Identical procedures were administered for all three sessions.

Measurements. Several self-report instruments were administered a week before the first PW session and 4 weeks after the last session (Cameron & Nicholls, 1998). At these times, participants were also asked to report the number of illness-related clinic visits the students had made in the previous 4 weeks. Self-reports were used instead of student health center reports because a considerable amount of students sought care from outside providers.

The Life Orientation Test (LOT; Scheier & Carver, 1985), which assesses generalized optimistic expectancies about outcomes in life, was administered. In this study, a modified version was used (Cameron & Nicholls, 1998). Eight of the original items were rated on a scale ranging from 0 (strongly disagree) to 4 (strongly agree). The original LOT demonstrated internal consistency (Cronbach's alpha = .76) and had a test-retest reliability coefficient of .79 over a 4-week interval. The original LOT was also shown to have convergent and discriminant validity with other personality variables (Scheier, Carver, & Bridges, 1994). In this study, 30 participants selected from across the experimental conditions were examined. They had a high test-retest reliability (r =

.86). Median splits of the distributions of score for men and women were used to divide the participants into two groups: pessimists and optimists.

Six items from the College Adjustment Test (Pennebaker et al., 1990) were administered to the participants (Cameron & Nicholls, 1998). They were selected based upon their internal consistency (Cronbach's alpha = .77). Items related to college adjustment were rated using a scale ranging from 1 (not at all) to 7 (a great deal).

In addition, a 7-item evaluation had participants rate their negative mood (i.e., depressed, helpless, anxious, calm, afraid, irritable, and angry) on the previous day (Cameron & Nicholls, 1998). Ratings were taken on a scale ranging from 1 (not at all) to 7 (extremely). A moderate amount of internal consistency was found on this instrument (Cronbach's alpha = .60).

A subscale assessing openness to experience was lifted from the Revised NEO Personality Inventory and administered to the participants (Cameron & Nicholls, 1998). This subscale consists of 12 items, each rated on a 5-point Likert scale. The instrument was unavailable for review, but Cameron and Nicholls reported that the "psychometric properties of this measure are well-established" (p. 87).

Finally, at the end of the third PW session, a 6-item questionnaire was administered (Cameron & Nicholls, 1998). The questionnaire assessed perceptions of the task's effectiveness in (a) eliciting disclosure of personal aspects of oneself, (b) enhancing disclosure of issues that occupied the writer's thoughts, (c) evoking strong emotions, (d) providing meaningful and valuable writing experiences, (e) helping to deal effectively with college-related problems, and (f) enhancing control over college-related problems. The items were rated on a 7-point scale ranging from 1 (not at all) to 7 (a great deal).

Because a large proportion of the participants reported no clinic visits, the clinic visit data were positively skewed (Cameron & Nicholls, 1998). In order to compensate, the authors conducted log transformations of pre-test clinic visits and used these transformations in the correlational analyses and analyses of pre-test differences between the experimental groups. In addition, difference scores were created by subtracting post-test clinic visits from pre-test clinic visits for use in the assessments of writing task effects. These resultant difference scores were normally distributed, with positive values reflecting increases in clinic use over time.

Results. There were two areas of analysis (Cameron & Nicholls, 1998). The first area of analysis examined individual differences on the results. Simple correlations revealed that optimism was positively associated with pre-test and post-test reports of college adjustment, but unrelated to negative mood and clinic visits. Openness to experience was positively related to an increase in clinic visits during the semester. Openness to experience was also associated with higher Scholastic Aptitude Test (SAT) scores and fall semester GPAs, poorer college adjustment at post-test, and stronger negative mood at the semester onset. (The article did not explain how SAT scores or GPAs were collected.)

The second area of analysis examined the effects of the interventions (Cameron & Nicholls, 1998). A series of ANOVAs were conducted, followed by planned comparisons or simple effects analyses, when appropriate. To begin with, pre-test measures revealed no significant differences between the writing conditions. Pessimists differed from optimists in that they reported lower levels of pre-test college adjustment relative to optimists, and pessimists reported relatively higher levels of negative mood compared with optimists.

At post-test, participants in both the self-regulation and disclosure conditions displayed an overall reduction in illness visits (Cameron & Nicholls, 1998). Control participants displayed an increase in illness visits. Relative to the control task, the self-regulation task produced a reduction in clinic visits, but the disclosure task did not.

Over time, optimists reported greater college adjustment scores at both pre-test and post-test relative to pessimists, although these groups reported equivalent changes in adjustment scores over time (Cameron & Nicholls, 1998). With regard to condition, scores decreased in both the control condition and the disclosure condition, but did not change in the self-regulation condition. The self-regulation task effect on college adjustment scores was equivalent for optimistic and pessimistic participants.

Control participants reported an increase in negative mood ratings over time (Cameron & Nicholls, 1998). Negative mood ratings remained stable for participants in the self-regulation condition. Negative mood increased significantly more for control participants in relation to the self-regulation participants but not in relation to the disclosure participants. Further, compared to self-regulation participants, control participants reported significantly more negative mood.

Compared with the control task, the disclosure task and the self-regulation task were rated as more effective in promoting disclosure of personal and emotional aspects of oneself, evoking intense emotions, and eliciting descriptions of issues that participants continued to think about after the session (Cameron & Nicholls, 1998). Both the disclosure task sessions and self-regulation task sessions were rated as more valuable and meaningful compared to the control sessions. Only the self-regulation task was rated as more effective than the control task in enabling participants to deal effectively with the problems of coming to college and to feel that they had gained control over them. Finally, disclosure task participants achieved higher GPAs relative to the self-regulation task and control task participants.

Limitations. A few unique limitations to Cameron and Nicholls's (1998) study are worth mentioning. Their sample was composed primarily of women. Several of the specific measurements used (e.g., permutations of other instruments) have not demonstrated their own construct validity. The authors did not explain how SAT scores and GPAs were collected; therefore, it would be difficult to replicate this experiment as it is presented. Finally, follow-up data were limited to 1 month.

Smyth (1998)

Smyth (1998) conducted a meta-analysis of 13 empirical studies on PW as developed by Pennebaker (Pennebaker & Beall, 1986). More specifically, Smyth examined the effects of PW on several measures of health. Only randomized experiments designed to investigate a variant on Pennebaker's original task were included. Each study had to meet several criteria in order to be included in the meta-analysis. Each study had to (a) contain an experimental manipulation of written emotional disclosure, (b) include a control group, (c) require participants to write about a traumatic versus neutral topic, (d) include an outcome measure of health, and (e) contain statistical information necessary to calculate an effect size.

Procedure. Following the guidelines put forth by Stock (1994), Smyth (1998) created coding variables to describe the studies. Only health outcomes that were measured at least 1 month post-writing were included, and short-term effects were measured using pre- to post-writing task differences. After all variables were coded in a rigid, consistent fashion, two additional raters recoded all of the studies. The range of agreement was 82% to 100% across all variables, with a mean agreement of 93%. Differences were reconciled by discussions among the three raters until a consensus was reached. Smyth used five moderating variables in his analysis: (a) participant characteristics (e.g., age, gender, and student versus nonstudent); (b) dose (e.g., the number of writing sessions, length of each session, and period over which the writing was administered); (c) essay content characteristics (e.g., past vs. current traumas); (d) outcome type (e.g., psychological, physiological); and (e) publication type (e.g., published vs. unpublished, quality).

Because the studies that were reviewed contained a variety of inferential statistics, all of the results were transformed into Cohen's *d* as the measure of effect size (Smyth, 1998). Cohen's *d* is a standardized mean difference estimate. The Cohen's *d*s were computed in two ways: (a) an overall effect size for each study and (b) one effect size for each specific outcome type examined, averaged across all outcomes within outcome type and within study. In addition, a single *d* for all short-term distress measures was calculated.

Although allowing more than one effect size per study can result in non-independence, it should be noted that the primary analysis used a single effect size from each study (Smyth, 1998). Further, analyses by content group were run independently, and one study never contributed more than one *d* to any one analysis (although studies with a wider range of outcome types did contribute a single *d* to a greater number of analyses). The corresponding correlation coefficient for each *d* was also computed.

> Smyth (1998) explained how he evaluated effect sizes as follows:
>
> The magnitude and significance of the overall mean weighted effect size was computed for all outcomes (averaged within study) and all studies. This procedure was applied again for each of the five outcome types, providing an estimate of the mean weighted effect size within each outcome type across all studies. ... Each effect size was weighted inversely to its conditional variance. ... The homogeneity of the effect sizes was examined to determine if the *d*s varies more than would be expected by sampling error. ... Non-continuous moderator variables were tested by dividing effect sizes into groups on the basis of study qualities and comparing the mean effect size between groups. This test resulted in Q_b, the between group goodness of fit, with an approximate chi-square distribution with p – 1 degree of freedom, where p is the number of groups. (p. 176)

Results. Overall, Smyth (1998) found a mean weighted effect size of .47 (r = .23) across all studies and outcomes. Excluding the largest outlier, the mean weighted effect size was .41 (r = .20). This suggests that PW assignments may be effective in 41% to 47% of the individuals who apply it. A fail-safe N (the number of null finding studies that would have to exist for the observed effect size to become nonsignificant) indicated that it is highly unlikely that unpublished studies (that were not included in this study) would compromise the results. Further, there was not a significant difference between the studies in which Pennebaker was an author and those in which Pennebaker was not an author, suggesting that the effect size was not due to experimenter effects.

Smyth (1998) found that PW tasks led to improved reports psychological well-being, physiological functioning, and general functioning. The mean effect size for health behaviors was significantly lower than the overall mean effect size as well as all of the other outcome types. The psychological well-being and physiological functioning outcomes were significantly higher than the general functioning outcome type. Across all of the studies, PW resulted in a significant increase in pre- to post-writing negative affect.

Smyth (1998) examined several moderating variables. Overall effect sizes were increased by two variables: higher percentages of males in a study and longer periods of time over which the PW was spaced. Psychological well-being effect sizes were increased by three variables: the use of student (vs. nonstudent) participants, instructions to write about current traumas (vs. past or current traumas), and unpublished studies. Finally, physiological functioning effect sizes were increased in studies that instructed participants to write about past or current trams (vs. past traumas only).

A correlation matrix between the moderating variables showed only two significant relationships between the moderating variables (Smyth, 1998). The first indicated that studies using more PW sessions were more likely to have been published. The second indicated that student status was inversely related to age. However, either the number of PW sessions nor age were related to well-being effect sizes.

Limitations. The primary limitation with Smyth's (1998) study is the exclusion of additional studies that were not published, but would have nevertheless, impacted the results. For example, studies that found the null hypotheses to be true (suggesting that PW assignments do not produce any noticeable effects) may not have been published. However, as previously mentioned, Smyth accounted for this to some degree by calculating a significantly high fail-safe.

Smyth, Stone, Hurewitz, and Kaell (1999)

Smyth et al. (1999) investigated the effects of a PW assignment about stressful experiences on two chronic diseases, rheumatoid arthritis (RA) and asthma. These diseases were selected because they are common, cause significant psychological, physiological, and economic burden, and are chronic conditions affecting daily life activities. It was hypothesized that experimental participants would demonstrate clinically significant changes in their symptomatology in 4 months after writing compared with a control group.

Procedure. Advertisements were printed in newspapers and at nearby medical facilities seeking individuals with asthma or RA to "participate in a study of your daily experience of illness" (Smyth et al., 1999, p. 1305). RA diagnoses were confirmed by a board-certified rheumatologist, who ensured that all participants met the criteria of the American College of Rheumatology. Asthma was diagnosed by a physician, who collected a history of asthma. Asthma patients also had to provide documentation of a reduction in expiratory function. Exclusionary criteria included: (a) current participation in psychotherapy or a defined psychiatric disorder, (b) use of medications that could interfere with symptom report or more than 10 mg of prednisone daily, (c) reporting inability to comply with the research protocol, and (d) being unable to write for a period of 20 minutes.

One hundred and twelve participants were randomly assigned to either a control or experimental group (Smyth et al., 1999). Smyth used a computer-generated random assignment scheme, which assigned 2 of every 3 patients (within disease group) to the experimental group. This unbalanced design was used to bolster the data of the experimental group for future scrutiny.

Participants in the experimental group were instructed to write "about the most stressful experience that they had ever undergone" (Smyth et al., 1999, p. 1305). Participants in the control group were instructed to write about their plans for the day.

As Smyth et al. stated, "Experimental participants were explicitly writing about stressful life experiences, while control group writing was framed as a time-management exercise to reduce stress" (p. 1305). The authors attempted to minimize expectancy differences by informing both groups that they were interested in their experience of stress. Each group wrote for 20 minutes a day for 3 consecutive days. The administrating experimenters were blind to condition.

Measurements. At baseline, participants completed several questionnaires, that evaluated their disease severity and quality of life (Smyth et al., 1999). They also completed a battery of questionnaires that evaluated their psychological well-being (e.g., social support, coping strategies, global stress) and mood (e.g., anxiety, alexithymia). Although Smyth et al. cited the references from which he pulled his questionnaires, the individual names and statistical information was not reported in the study.

Disease activity was evaluated at baseline, 2 weeks, 2 months, and 4 months after the PW (Smyth et al., 1999). The pulmonary function of participants with asthma was assessed in the laboratory by spirometry, following the guildeline recommended by the American Thoracic Society. The primary outcome measure was forced expiratory volume (FEV) in 1 second. Outcome evaluations of RA patient were made with a structured interview completed by the treating rheumatologist. The primary outcome measure was the rheumatologist's global evaluation of patients' current clinical status, as recommended by the American College of Rheumatology. Each RA participant had four clinical examinations performed by the same rheumatologist. Several physicians, who were blind to experimental condition, conducted the evaluations.

The clinical significance of the observed differences between baseline and the 4-month follow-up were measured by three categories of change: (a) improvement, (b) no significant change, and (c) worsening (Smyth et al., 1999). For asthmatic participants, improvements of 15% or greater FEV over or below baselines values were defined as improvement and worsening, respectively. For RA participants, a categorical system was used (asymptomatic, mild, moderate, severe, very severe). The authors followed published guidelines that a shift in one category to another is a clinically significant change. Statistical information for these measures was not reported.

Overall group comparisons from baseline to follow-up were calculated using ANCOVA, while statistically controlling for baseline levels (Smyth et al., 1999). Using chi-square analyses, the authors examined the distribution of patients who met their criteria for clinically relevant improvement in each group. Changes across time were examined using repeated measures ANCOVAs.

Results. At baseline, the participants did not differ on any demographic variable (e.g., age, sex, education, employment status, income), health behaviors (regular medication use, exercise, smoking), or psychological measures (alexithymia, intrusive and avoidant thoughts, coping strategies, or anxiety; Smyth et al., 1999). Also at baseline, disease severity did not differ between the groups for asthma outcomes and RA outcomes. These conclusions were reached using an α of $p < .20$. Smyth et al.

reported that the sample represented the typical distribution of these diseases and the geographic area from which it was drawn.

Smyth et al. (1999) had two areas of analysis. The first area was health status. Four months after the PW, asthmatic participants demonstrated a greater improvement in FEV compared with controls. A similar improvement was found in overall rheumatic disease activity. These analyses were replicated using nonparametric statistics (i.e., Wilcoxon matched-pairs signed-rank test). Identical baseline and follow-up results were found.

Participants in both the experimental groups demonstrated greater rates of improvement and lesser rates of worsening than the control group (Smyth et al., 1999). These results were replicated by including all participants who had not completed the study in a Control/No Change group. These findings would suggest that the differences observed in health status were clinically significant.

The second area of analysis was how outcomes changed over time (Smyth et al., 1999). Asthmatic participants demonstrated clinically significant improvements at the 2-week, 2-month, and 4-month evaluations. RA participants did not exhibit clinically significant improvements until the 4-month follow-up.

Limitations. Smyth et al.'s (1999) sample was comprised of community volunteers with RA and asthma, who may have self-selected themselves for the study in a way that is different from the general population of individuals with RA and asthma.

Further, the unbalanced design, coupled with the small N, may have magnified the results, and limit external validity.

With regard to method, the control group was instructed to write about their plans for the day (Smyth et al., 1999). This exercise could have evoked emotionally pleasant or unpleasant feelings about the impending activities. These thoughts and feelings may have accounted for some of the observed differences.

Smyth et al.'s (1999) questionnaire battery is equivocal in nature. Smyth et al. did not label their questionnaires by name, nor did they provide statistical information on any of the outcome measures' reliability and validity. A reader of this study could not replicate this study without conferring with the authors. Several physicians conducted the evaluations, creating possible discrepancies in outcomes data.

Smyth et al. (1999) concluded that there was an absence of baseline differences, but used a weak α level of $p < .20$ to make this conclusion. It should also be noted that 45% of the experimental group and 24% of the control participants demonstrated clinically significant, and meaningful, improvements in symptomatology. Further, a small percentage (4%) of the experimental group developed an increase in symptomatology. Finally, follow-up data were limited to 4 months.

Non-Empirical Literature Review

The literature contains several case studies and illustrations for the application of therapeutic writing, storytelling, and dialogical engagement in psychotherapy.

Although this literature is qualitative in nature, and not rigidly controlled, it provides some suggestions for future empirical research. The following is a brief review of this literature.

In a review of what he calls scriptotherapy, Riordan (1996) provided a detailed account of several anecdotal uses of therapeutic writing. He cites examples of journal writing, writing in dialogue journals, autobiographical works, poetry, stories, and letter writing. These techniques have been applied primarily as a creative experience that helps establish or intensify the process experience of therapy. They have also been applied to decrease inhibition of affect, establish greater cognitive organization, personality integration, facilitate communication and address trauma and grief issues.

Riordan (1996) stressed the involvement of the client in a physical activity as a strong component of therapeutic writing. He cautions therapists to watch for the use of scriptotherapy as a means of avoiding appropriate action or indulging in excessive rumination. He believed scriptotherapy is best applied in interaction with, but limited guidance by, a psychotherapist. He concluded his article by providing guidelines for the successful application of scriptotherapy.

Writing has also been recommended for specific presenting problems. Jordan and L'Abate (1995) presented several case studies illustrating the use of PW in conjunction with interpersonal psychotherapy with clients in enmeshed families. The exercises teach the development of a balance between mastery over affectual expression and cognitive shifts in their approach to family relationships. Further, Jordan (1998) has described the use of PW in conjunction with psychotherapy as an intervention with conflictual couples. Also, Rabinor (1998) presented a case report on the use of journal writing as a complement to psychotherapy with an adolescent female with anorexia nervosa.

Davies, Thomas, and Leudar (1999) presented a case study of the application of a dialogical, or discursive, technique to an individual who experienced auditory hallucinations. Contextualizing the voices in a personal narrative that was constructed by the patient allowed her to engage the voices in a more organized, structured, and meaningful manner. Davies et al. used this technique to introduce moral responses to potentially dangerous voices that commanded self-harm. They compared and contrasted this technique with more traditional cognitive therapy.

Laube and Trefz (1994) described the application of a story-creation framework in 12-week group treatment program of depression. The advantages of this approach are that it opens up possibilities, perspectives, and opportunities that are typically not considered by a depressed client. Laube and Trefz believed this approach facilitates the accessibility and comprehension of the therapy process. They saw the interaction of clients as an optimal setting for the development of new, more adaptive narratives.

Krieshok, Hastings, Ebberwein, Wettersten, and Owen (1999) described the development of an intervention program for veterans seeking assistance in a vocational rehabilitation program at a Veterans Administration Medical Center. Clients were asked to narrate a story of their desired future, projected 1 year from the intervention date. Clients were asked to be as specific as possible regarding their living circumstances, employment situation, and relationships. They were asked to describe how they saw themselves fulfilling the story. These stories were transcribed and qualitatively analyzed for characteristics and themes that naturally emerged from the stories. Prominent themes that emerged included specificity/vagueness, congruence between stated goals and client's past, active/passive approach to current life situation, and practicality. The authors then rated the stories on these dimensions and compared them with employment outcomes during the following year. Client's whose stories were rated higher rating on all of these factors were associated with better vocational outcomes. The authors support this approach because it stimulates the imagination and helps clients develop a clear focus and direction toward their goals. It also helps them problem solve by illuminating deficits in their adaptive plans.

Conclusions

It has been recognized that traumatic life events are stressful and that, coupled with decreased emotional expression, can have deleterious effects on one's psychological and physical health (DeLisi et al., 1986; Pennebaker & O'Heeron, 1984; Selye, 1976). This study has reviewed the growing empirical literature for PW as a means to facilitate emotional expression and improve health. The majority of the PW assignments focused on the emotional and cognitive aspects of a past or current trauma using one to four sessions.

Across several, well-controlled, empirical studies, PW assignments have been demonstrated to have an overall positive effect size of 41% to 47% (Smyth, 1998). PW has been demonstrated to result in self-reports of improved general functioning (Pennebaker and Beall, 1986). It has been demonstrated to be helpful when applied to specific stressors. It facilitated adaptation to college in first-year college students (Cameron & Nicholls, 1998) and increased the likelihood of obtaining employment after being laid off from work (Spera et al., 1994).

PW has resulted in improved functioning in several areas: (a) affect, (b) cognition, (c) physiology, and (d) behavior. Affectively, PW frequently caused an initial surge of unpleasant affect immediately after writing (Donnelly & Murray, 1991; Greenberg et al., 1996; Greenberg & Stone, 1992; Pennebaker et al., 1990), including feelings of sadness, guilt (Petrie et al., 1995), anxiety, and aggression (Murray et al., 1989). Studies have reported contradictory findings as to whether unpleasant affect increases over the course of several days of writing (Pennebaker & Beall, 1986) or steadily decreases (Donnelly & Murray, 1991; Murray et al., 1989). Pleasant moods have been found to decrease after each PW session (Donnelly & Murray, 1991; Greenberg et al., 1996), but participants have also reported feeling more positive about the topic they wrote about as well as themselves (Donnelly & Murray, 1991). Overall, improvements were related to an overall shift from unpleasant to pleasant feelings (Esterling et al., 1999).

PW has been demonstrated to produce adaptive cognitive changes, including more time spent processing a trauma (Pennebaker & Beall, 1986) and improving self-esteem (Estering et al., 1990). PW has resulted in more adaptive ways of thinking about a trauma or stressor (Donnelly & Murray, 1991). PW has also resulted in reports of general improvements in psychological well-being, particularly when addressing current traumas (Pennebaker & Beall, 1986). Esterling et al. (1999) have proposed that the greatest cognitive changes occur when a connection is made between unpleasant affect and the underlying reason for it. This is congruent with the theory of catharsis (Breuer & Freud, 1895/1966).

PW has demonstrated a number of physiological effects. Clients who have completed PW assignments may experience an immediate increase in physical symptoms (Greenberg & Stone, 1992), such as increased blood pressure. But over time, as clients become accustomed to the exercise, they may exhibit a decrease in physical symptoms (Pennebaker & Beall, 1986).

PW has also been demonstrated to significantly impact the functioning of the immune system·(Esterling et al., 1999). PW has resulted in an increase in overall immunological functioning (Pennebaker et al., 1988), a better response to a series of hepatitis B vaccinations (Petrie et al., 1995), and greater suppression of latent viruses (Estering et al., 1994). These findings may be of particular importance to individuals with compromised immune systems, such as clients undergoing chemotherapy or clients infected with HIV.

PW assignments that included specific instructions to write about the emotion and factual aspects of a trauma have resulted in an improvement in upper respiratory symptoms (Greenberg et al., 1996) and general physiological functioning (Greenberg & Stone, 1992). It has also resulted in a decline in the number of visits participants made to their physician for illness (Cameron & Nicholls, 1998; Greenberg et al., 1996; Pennebaker et al., 1988; Pennebaker et al., 1990; Pennebaker & Beall, 1986) up to 4 months following the intervention (Pennebaker et al., 1988). In fact, writing about an imaginary trauma has resulted in a decrease in illness visits (Greenberg et al., 1996). One study found a decrease in the symptoms of asthma and RA 4 months after the completion of PW assignments. The literature suggests that physiology may be most improved when clients focus on past or current traumas as opposed to only past traumas (Esterling et al., 1990).

PW assignment had virtually no impact on behavior (Pennebaker & Beall, 1986; Pennebaker et al., 1988). The targeted behaviors were most often health behaviors, such as exercise and consuming alcohol. However, participants who completed PW assignments that focused on developing coping skills reported that they were able to effectively deal with the problems of coming to college and that they had control over those problems (Cameron & Nicholls, 1998).

Several characteristics have repeatedly been noted in the essays of PW assignments that resulted in improved functioning. These characteristics speak to the issues of methodology as well as the content of the essays themselves. These characteristics included essays that were personal, meaningful and revealing of deep emotions (Cameron & Nicholls, 1998; Greenberg & Stone, 1992; Murray et al.,1989; Pennebaker et al., 1988; Pennebaker & Beall, 1986; Spera et al., 1994). The essays used a significant amount of emotional words, both positive and negative (Esterling et al., 1994), as well as insight words (Petrie et al., 1995). Essays that dealt with previously disclosed essays did not produce a greater increase in mood and functioning than essays about previously undisclosed traumas (Greenberg & Stone, 1992). Although this finding does not necessarily refute the effects of disinhibition, it does not support it. Finally, the effectiveness of PW increases with a greater amount of assignments or sessions (Esterling et al., 1999).

Most importantly, PW assignments that encouraged the development, implementation, and review of coping strategies proved more especially effective in improving functioning (Cameron & Nicholls, 1998). Adaptive adjustments may be particularly facilitating in individuals who have a natural inclination to be pessimistic toward themselves and their environment. This finding stresses the importance of aiming a PW assignment toward increasing an individual's sense of self-efficacy. This finding speaks to the importance of an individual's development and how this impacts his approach to coping.

Personality type was also a strong predictor on the effects of a PW assignment (Esterling et al., 1994). Individuals who disclosed a high amount of material demonstrated stronger immune responses than individuals who disclosed a moderate or low amount of material (Esterling et al., 1990; Pennebaker et al., 1988). Individuals who tend to deny their emotions to themselves and to others tended to have a poorer immune response no matter how much they disclosed (Esterling et al., 1990), as well as poorer immune control over a latent virus (Esterling et al., 1994). Individuals who tend to be sensitive about their emotions and who disclose large amount of material may benefit the most from PW. Moreover, individuals with a high level of insight profit more from PW (Donnelly & Murray, 1991). Finally, females and individuals who make frequent illness visits may benefit more from PW (Pennebaker et al., 1990).

Compared with psychotherapy, PW demonstrated lesser decreases in unpleasant mood and lesser increases in pleasant mood (Greenberg & Stone, 1992; Murray et al., 1989). Alternatively, differences between the rate of decline in illness visits between participants completing PW assignments and participants in psychotherapy were not observable 4 months after the interventions (Pennebaker et al., 1990). Further, compared with psychotherapy, PW has demonstrated changes in thinking that were not significantly different from individuals participants in an eclectic psychotherapy (Donnelly & Murray, 1991). These findings suggest that PW alone may arouse more initial discomfort than psychotherapy, but both are more effective than no intervention.

The limitations of the studies speak to the direction future PW research should go. PW needs to be examined in wider clinical populations and with a wider variety of trauma, illness, and chronic disease. More controlled time-lines and extended follow-up data are needed to know how many sessions are needed for improvement or how long the improvements will be maintained without booster sessions. Future research should also focus on the effects of applying PW in the content of psychotherapy. The two may produce the desired effects while minimizing much of the unpleasant affect aroused by PW alone. Future studies should also use more standardized instruments to back their findings.

Overall, PW is a cost- and time-effective intervention that may produce significant results in the overall functioning of clinical populations. It may be particularly helpful to populations that have experienced specific traumas and have insufficient coping skills to make their experiences manageable. PW involves unsophisticated methods that could easily be incorporated into psychotherapy, on an individual or group level.

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